

Western Industry

July 1954

NEW FEATS in Western steel fabrication. Stainless steel pipe is heat treated for a severe corrosion application in an AEC project. Pipe in the slings is headed for the furnaces, while that on the left awaits re-rolling to remove minor distortion.

... see page 30



FEATURED • *this month*

Employees help run the show
New uses for fiberglass plastics
New heights in food sanitation

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Frankly, we can't cut everybody's shipping costs 50%. Some we can only help out about 25%, or 33%. And some not at all.

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If you'd like to give this more thought, we have a new booklet showing how other well-known western manufacturers have cut costs with Cabco containers. Just published—write for your copy.
Address: Dept. A

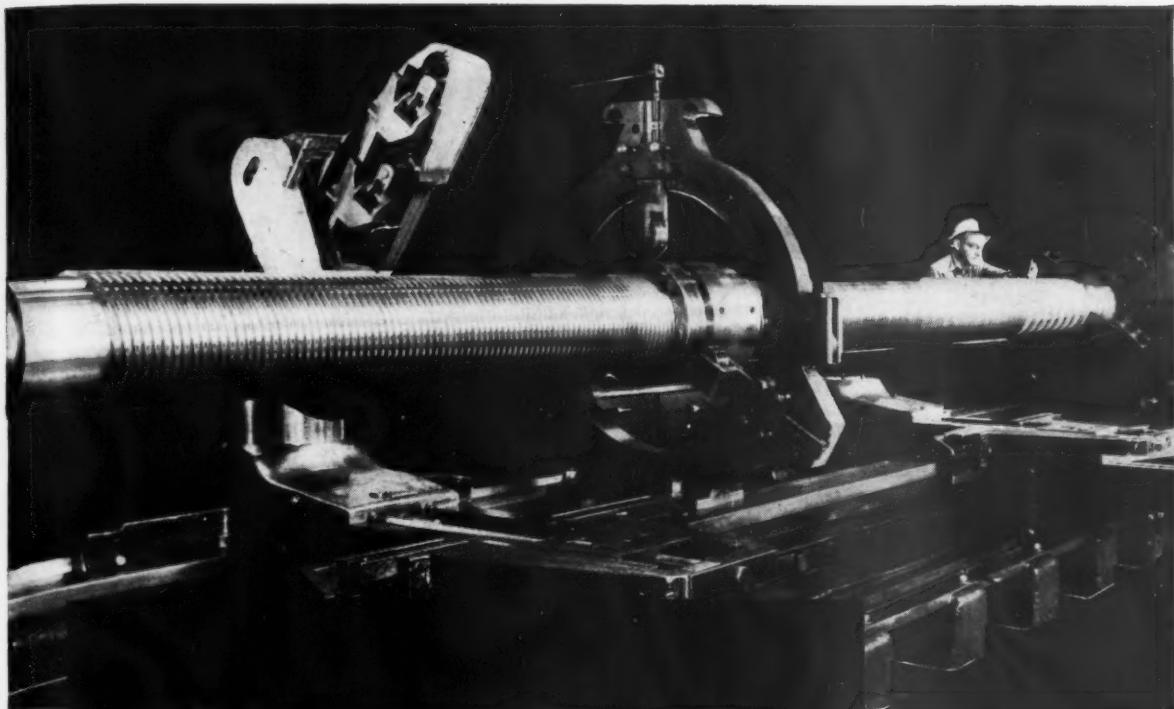
DUFF CALIFORNIA CO.

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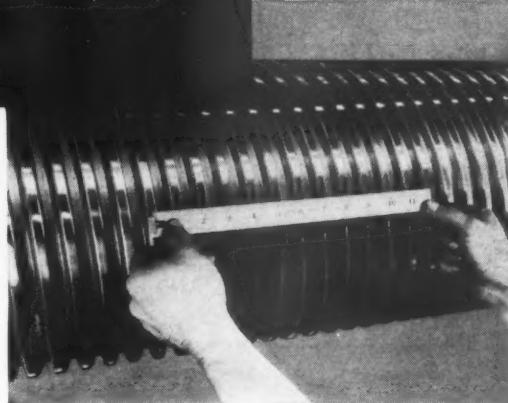
27-foot operating screw gets a giant thread!

Tooling problems in machining an unusual thread on a 13" by 21' section of this 27' operating screw were quickly solved by The National Supply Company's Torrance, California, Plant Machine Shop.

The design specification called for a general purpose Acme thread of 1" pitch and 5" lead—a quintuple or "five start" thread. To meet it accurately, and keep machining time to a minimum, National's skilled operators designed a special holder for the threading tools.

This holder not only permitted all five threads to be machined simultaneously, but also kept the maximum variation in thread thickness at the pitch circle to only .003 inch!

The precision work on this big job is typical of what National can do through the complete facilities of its Torrance plant. These facilities serve the most exacting needs of western industry—in many and varied ways. Why not put them to work the next time you have specialized equipment needs?



Close-up with 12" scale shows the size of "five start" thread that was turned on a double carriage engine lathe. National also melted, shaped and heat-treated the 15,500 pound forging necessary for this job.

INDUSTRIAL PRODUCTS DIVISION

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JULY 1954

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Published monthly by
KING PUBLICATIONS
609 Mission Street
San Francisco 5, Calif.
Phone YUKon 2-4343

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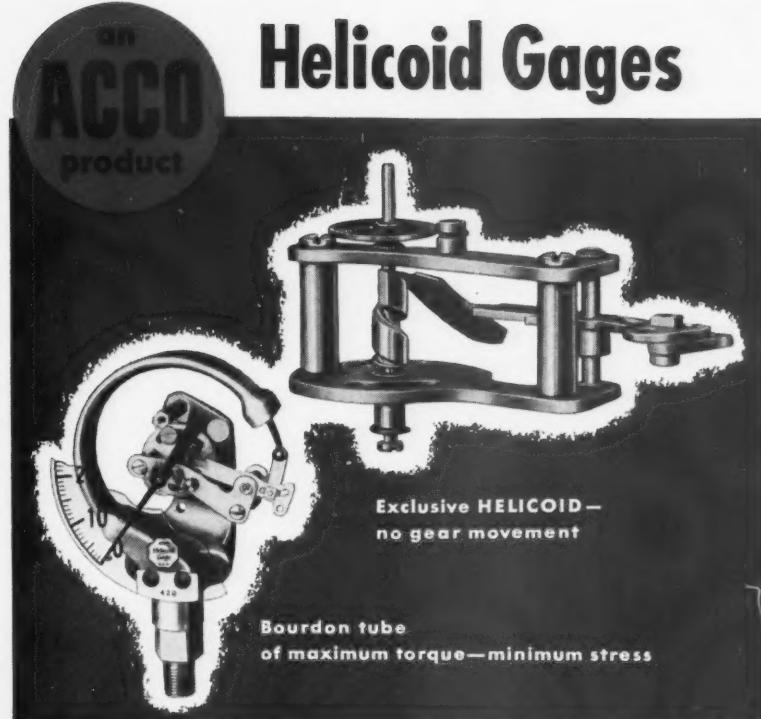
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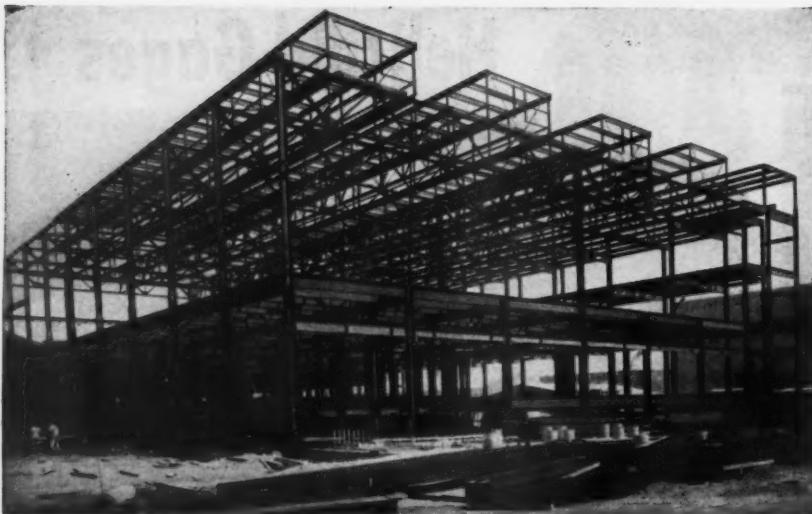
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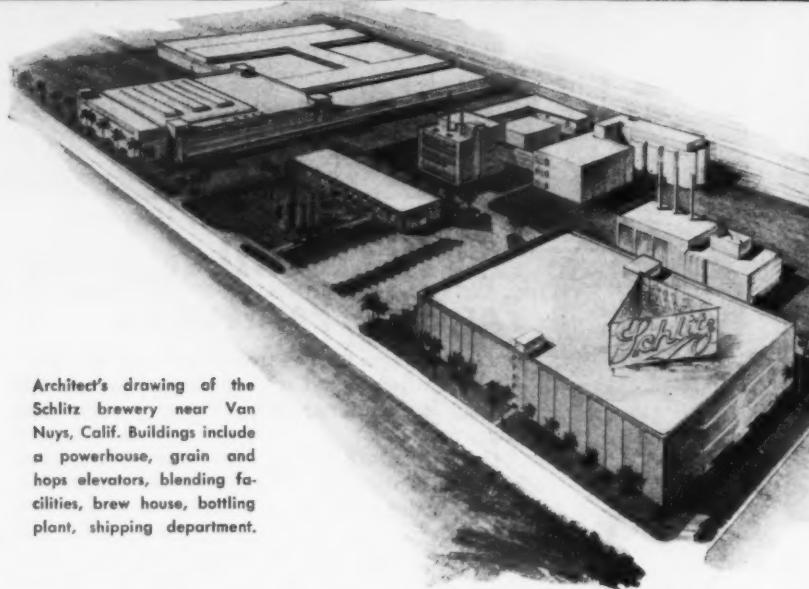
927 Connecticut Avenue • Bridgeport 2, Connecticut





Bottling plant of the new Schlitz Brewing Co. brewery as the steel framework neared completion last fall. General Contractor: P. J. Walker Co., Los Angeles. Plans and specifications were prepared by Harley, Ellington and Day, Inc., Detroit. Two Los Angeles firms, Brandow and Johnston and Dames and Moore, were consultants on this project.

Shown almost completed below, the new Schlitz brewery will have an annual capacity of one million barrels.



Architect's drawing of the Schlitz brewery near Van Nuys, Calif. Buildings include a powerhouse, grain and hops elevators, blending facilities, brew house, bottling plant, shipping department.



\$20 MILLION SCHLITZ BREWERY IN SOUTHERN CALIFORNIA

The beer that made Milwaukee famous is about to be brewed in sunny Southern California. The new unit, first Schlitz brewery on the West Coast, stands on a 35-acre site in the San Fernando Valley near Van Nuys, just north of Hollywood. It will have an annual capacity of one million barrels.

More than 1700 tons of structural steel for the new brewery was fabricated by Bethlehem Pacific at its Los Angeles Works and erected by Bethlehem Pacific's erection division.

In addition, more than 20,000 high-strength bolts, specified instead of field-driven rivets, were used to make permanent structural connections. Making possible quiet, speedy connections, these bolts are made by Bethlehem Pacific at its Los Angeles bolt and nut plant. The Schlitz buildings are probably the first large structures to be erected in this area with bolted connections.

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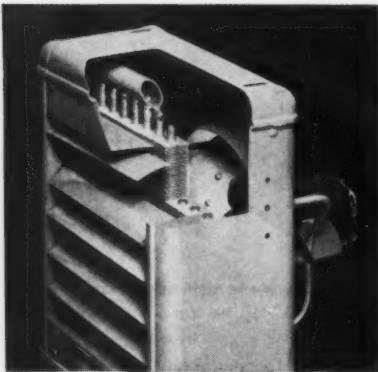
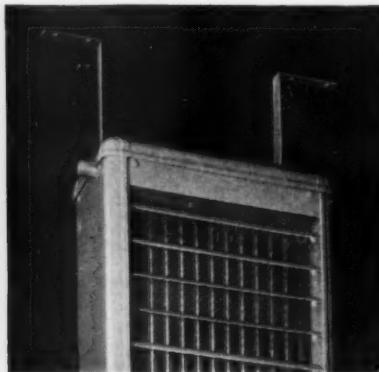
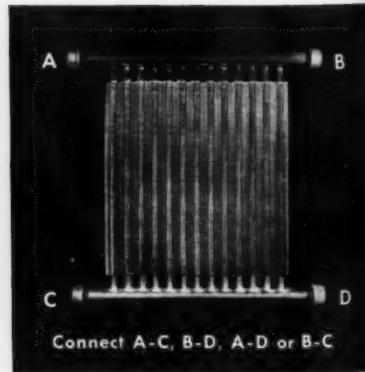


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Modern-design Speedheaters slash fuel costs up to 25% when used as complete systems or supplements to existing central systems.

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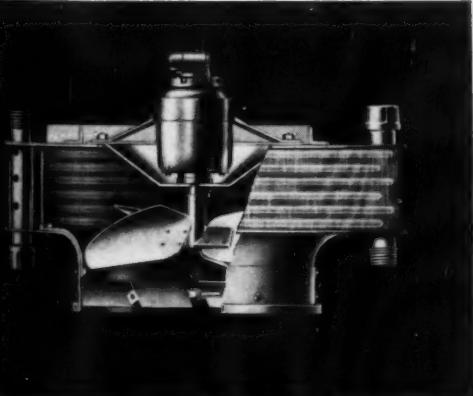
central system for most effective heat coverage . . . or satisfy, through flexible unit selection and placement, your entire heating needs.

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PROMPT SHIPMENT—These Speedheaters are available for immediate shipment from our Pacific Coast Plant at Berkeley, California.

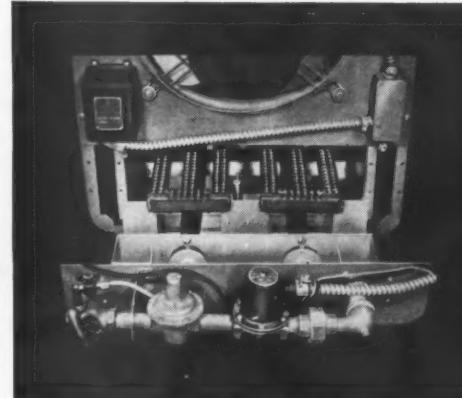
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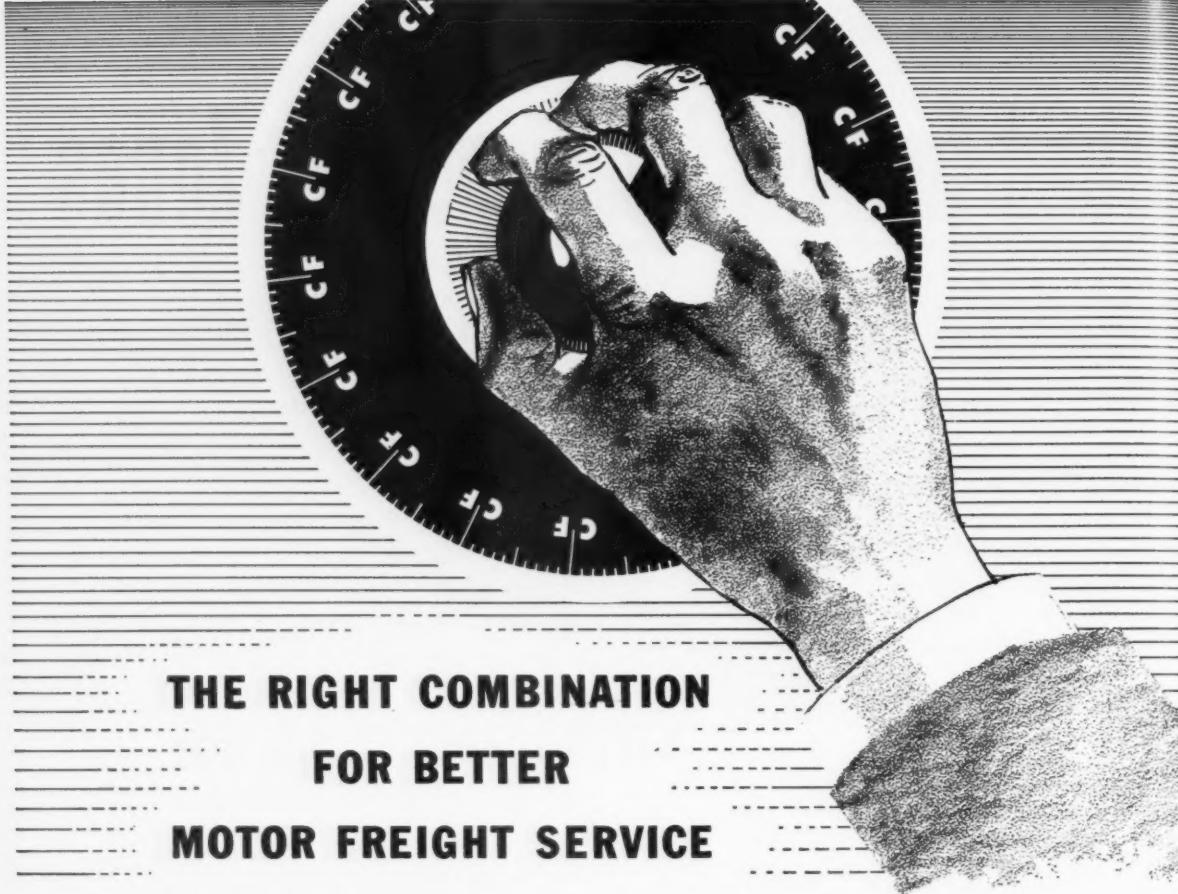


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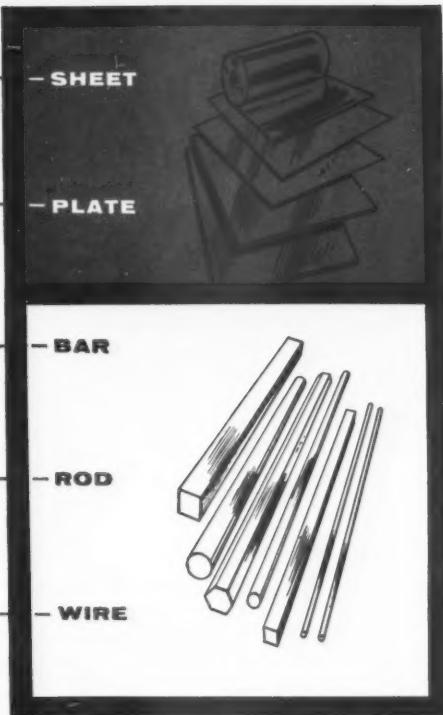
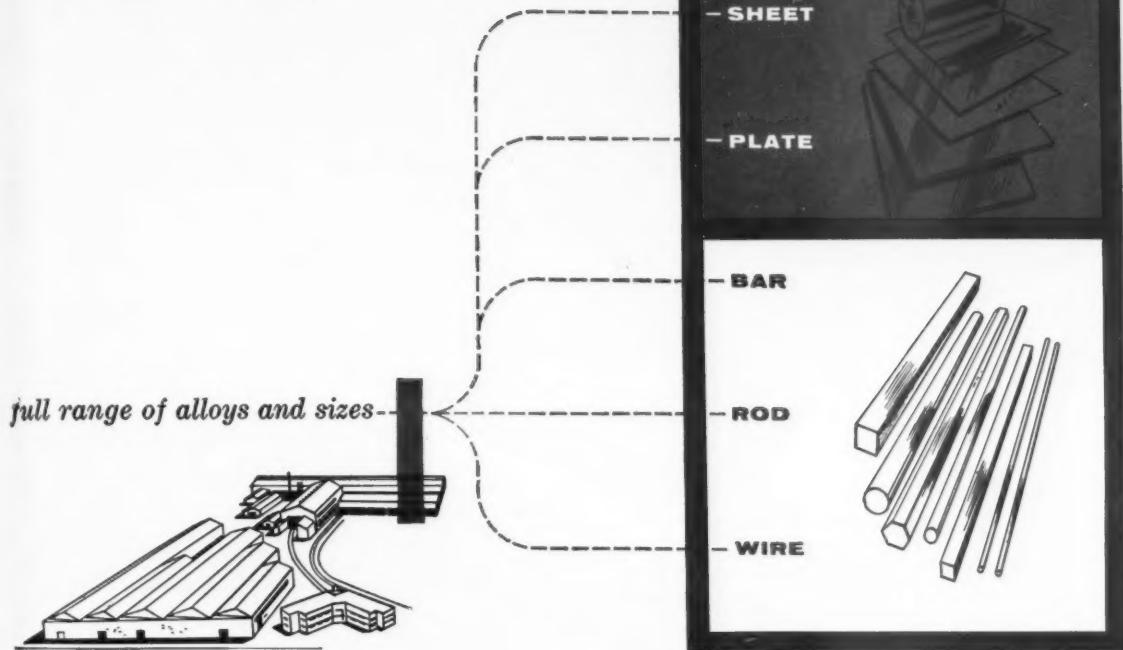


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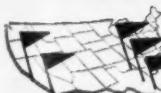
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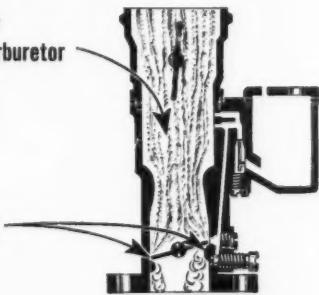
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★ Patent applied for

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STANDARD OIL COMPANY OF CALIFORNIA



How we opened the door to lower costs for Ford

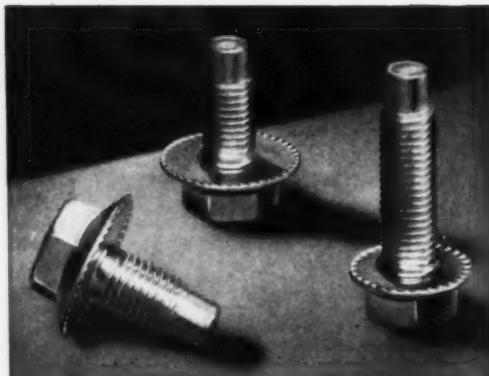
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

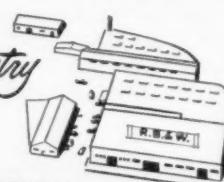
We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.



FASTER ASSEMBLY, reduced costs were the pay-off, using RB&W designed wide-flange SPIN-LOCK screws (left) for door hinge. Other SPIN-LOCKS (right) hold hinge on door. SPIN-LOCK screws can't loosen because ratchet-like teeth lock into surface and hold tight.

3.10

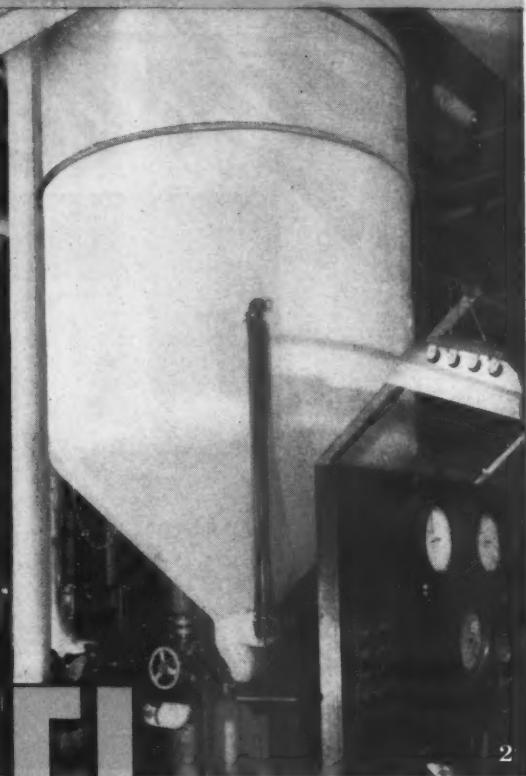
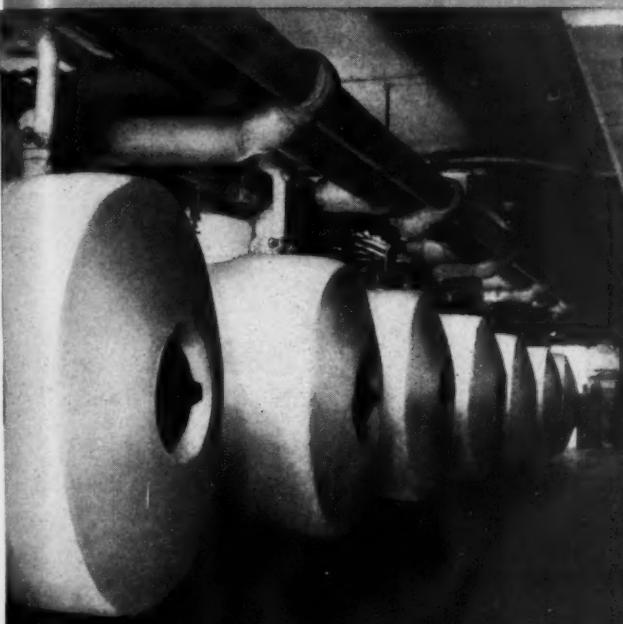
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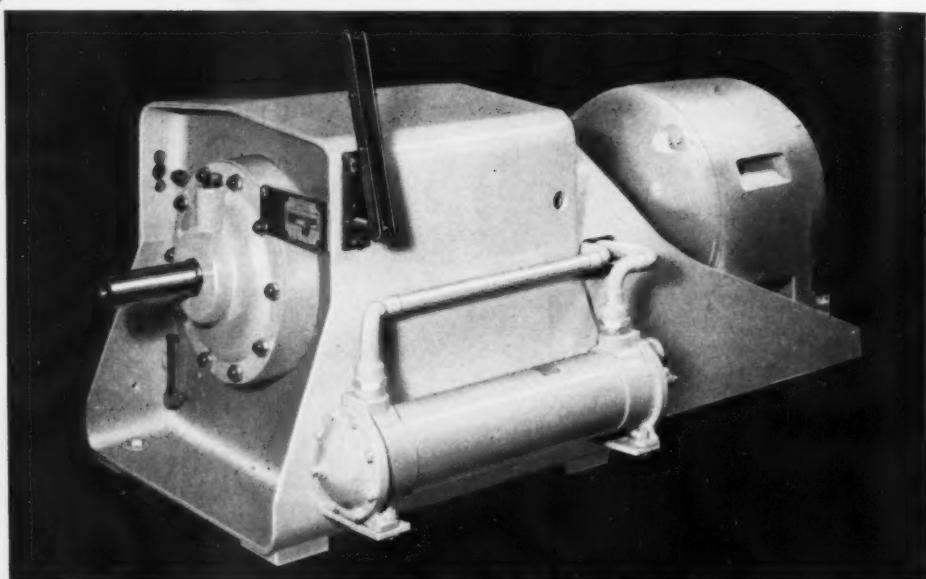
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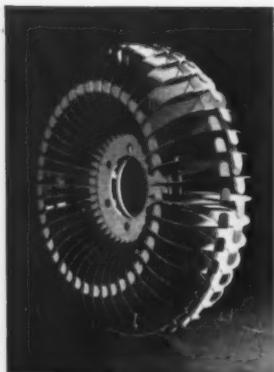
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A phantom view of the driving and driven members, which provide smooth, reversible power transmission.

For smaller applications the Type TM Constant Speed Gýrol Fluid Drive is available in ratings from 1 to 20 h.p.

HERE IT IS! A brand-new fluid drive that will help you solve many tough industrial-drive problems. It's the American Blower Type VS Class 2 Gýrol Fluid Drive. A compact, self-contained, adjustable speed unit.

The result of years of development and research, this adjustable-speed fluid coupling is crammed with features. It has unlimited application possibilities, with its wide-range, stepless speed, reversible control. Even on constant-torque loads, a 4-to-1 speed range is obtainable!

It permits driving motors to reach full-load speed before engaging the

load. In many cases simple across-the-line starting may be used. Adjustable speed may be obtained by either automatic or manual adjustment of the speed-control lever.

The new Type VS Class 2 Gýrol Fluid Drive is available in six sizes . . . 7½ through 800 h.p., at normal motor speeds up to 1800 r.p.m. Built in five standard arrangements, it can be used on a wide variety of industrial applications.

For complete information about the Class 2 Gýrol Fluid Drive, give your nearest American Blower Branch Office a call, or write us for Bulletin 9419.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN

CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

AMERICAN BLOWER



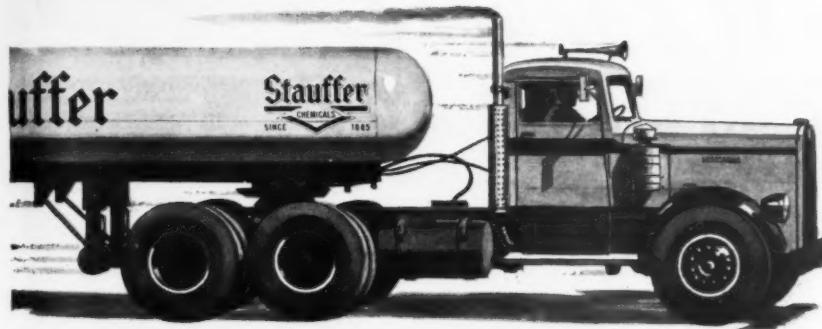
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CHEMICALS!**



FOR FAST SERVICE, CALL STAUFFER!

Wherever you may be located in the West, you can depend on the fleet of Stauffer tank trucks to speed your order of bulk chemicals to your plant. In any quantity, at any time—call STAUFFER for all your chemical needs!



- **Muriatic Acid**
- **Nitric Acid**
- **Sulphuric Acid**
- **Caustic Soda**

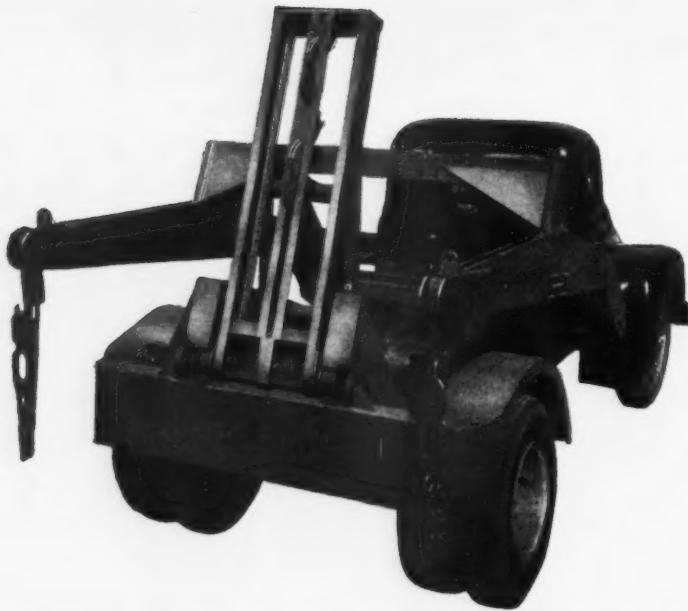


**STAUFFER
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COMPANY**



SAN FRANCISCO • NORTH PORTLAND • TACOMA • LOS ANGELES

July, 1954—WESTERN INDUSTRY



WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the

dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.



WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 564 N. Knox, Knoxville 17, Tennessee



Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.



Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.



Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.

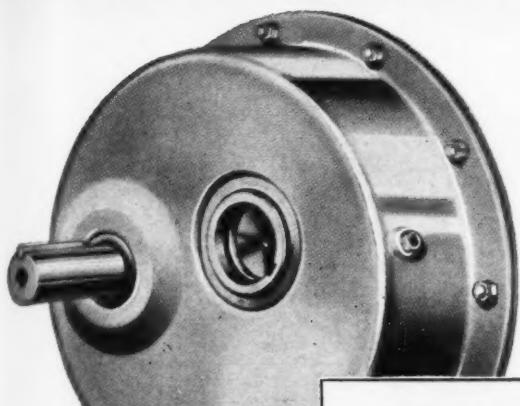


Universal Type built up to 12 cu. yd. capacity with top and end doors.



Five cu. yd. container with swivel casters for handling waste blast sand.

Falk **ALL-STEEL** Shaft Mounted Drives



SIX SIZES

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm

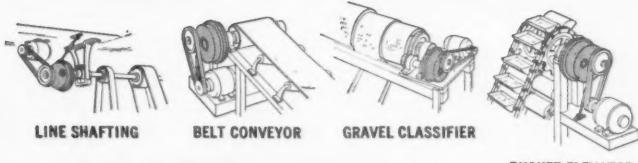
IMMEDIATE DELIVERY ...from West Coast stocks

Units and spare parts in Factory Stock at Oakland, California and Portland, Oregon. Authorized stocking Falk Distributors throughout the West.

**These versatile, NEW
speed-reducing units
save space, power, material and time**

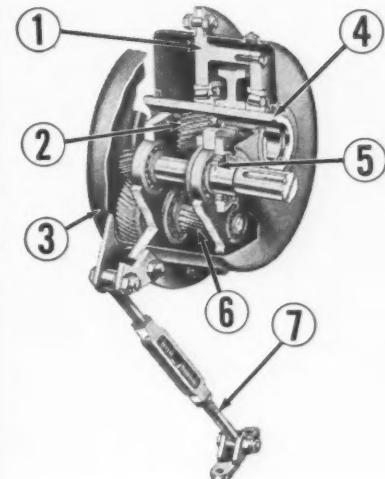
Here is the economical solution to the countless application problems requiring efficient speed reduction in limited space! The new Falk all-steel Shaft Mounted Drive—a modification of the universally-accepted Falk Motoreducer design—embodies many exclusive structural and functional features which add up to better service, longer life and substantial savings.

This rugged, compact drive mounts directly on the driven shaft—a distinct saving in floor space. Its precision Falk helical gearing gives highest mechanical efficiency, with a resultant power saving. No adjustable motor bases or slide rails are required. Installation is simple and rapid—output speeds can be quickly changed; thus time is saved...Write to Department 247 for engineering bulletin, including selection and dimension details.



APPLICATIONS UNLIMITED

The range of applications to which the all-steel Falk Shaft Mounted Drive is ideally suited is so wide that complete listing is impracticable. The sketches above are included only to indicate a few typical installations where considerable speed reduction in limited space is an important advantage.



FALK "In-Built" Factors...
that give maximum efficiency,
convenience and dependability

- 1 **All-steel Frame**, with more than double the rigidity of iron, supports all rotating elements.
- 2 **Precision Helical Gears**, designed and machined by Falk, rated to AGMA standards.
- 3 **Pressed Steel Housings**, whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.
- 4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.
- 5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.
- 6 **Positive Lubrication**, continuous direct dip of revolving elements at all speeds.
- 7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

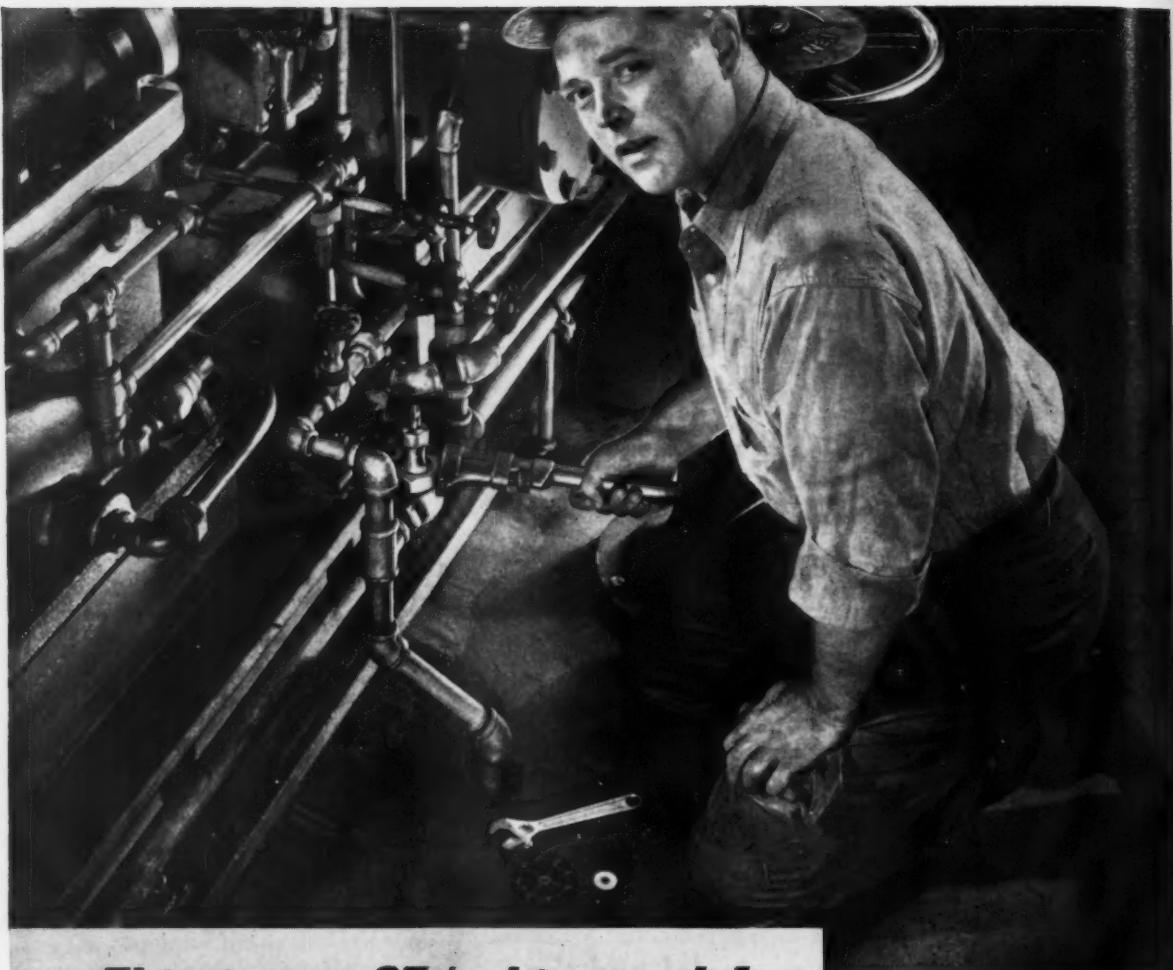
THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

• Motoreducers	• High Speed Drives	• Marine Drives
• Speed Reducers	• Special Gear Drives	• Steel Castings
• Flexible Couplings	• Single Helical Gears	• Weldments
• Shaft Mounted Drives	• Herringbone Gears	• Contract Machining

FALK

...a good name in industry



This is my 27th this week!

Most of your valve repair jobs are simple—a few minutes here, an hour or so there. But it's the way they add up that counts. For if your plant is typical, you can number your valves by the hundreds—or even thousands.

You have to figure a certain amount of valve maintenance, of course. However, there is a limit to what's reasonable—and there is a way to hold to it.

Here's where thrifty buying comes in—buying better quality valves and fittings in the first place—buying known dependability instead of a bargain and a promise. And it's Crane that offers the opportunity for thrifty buying . . . with a piping equipment line of highest quality and suitability.

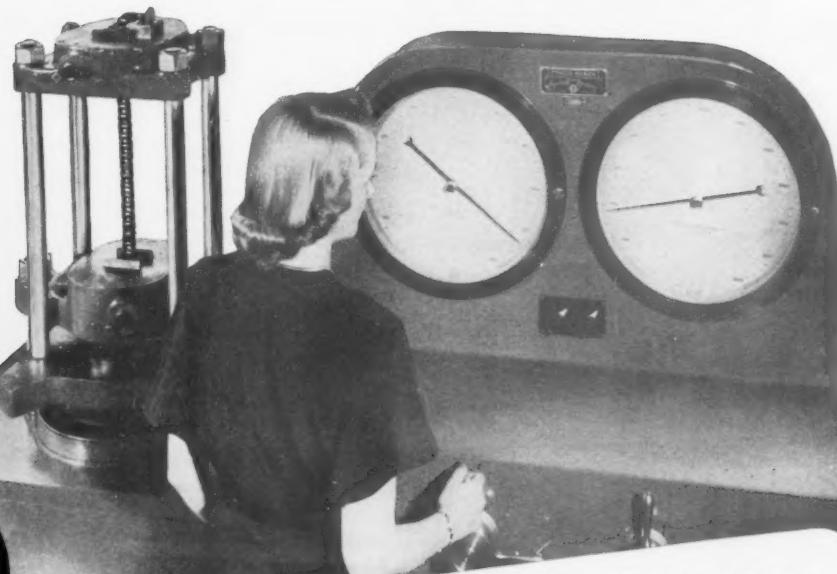
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Tortured and torn, in tests more rugged than any you would give it in normal use, Atlas Roller Chain gives daily proof on this Tensile Testing Machine of its super-strength. You know, before you buy it, that Atlas Chain has all the strength you'll ever need . . . to stand up and take it . . . year in and year out . . . under every operating condition.

The Tensile Tester is your guarantee that every Atlas Chain drive will deliver full rated horsepower. Result . . . your machine can run at full rated speeds, with consistently greater production and lower maintenance.

For maximum load-carrying ability and longer trouble-free life, install the chain with pre-tested strength.

Write today for the new **Atlas Catalog and Handbook** on roller chain. Atlas "Super-Life" Roller Chain is available through leading distributors everywhere.

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Mutual 1922

ATLAS ROLLER CHAIN





Pinched for space?

Look how planned lighting helped turn storage space into office space

Up until a year ago, Argonaut Insurance Exchange, of San Francisco, was short of office space. The firm had leased all the footage it could get in adjoining buildings. The only other possibility for more space—besides moving—was a basement storeroom (top left). But converting this into an office seemed hopeless, especially from a lighting standpoint. Just to make sure, though, the company called in P.G. and E.'s lighting engineers. After making a free survey, our engineers showed the Argonaut people a way to light the basement with surface-mounted fixtures. Result: The com-

pany decided to go ahead with the job. Now the basement is a handsome, well-lighted office (large photo). The people who work in it are enthusiastic about their new surroundings. And the cost of converting it is more than offset by the lower rent the company pays for basement space.

Perhaps your lighting problem isn't the same as Argonaut's. But whatever it is, our lighting engineers will be glad to tackle it for you, to show you how good lighting can help raise the output and the quality of work of your employees. So why not let us make a free lighting survey for you soon?

For free planned-lighting advice, call your nearest P. G. and E. office today

P·G and E·

Pacific Gas and Electric Company

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they choose the very finest made by

The beautiful new DC-7 UNITED MAINLINER now placed into transcontinental service by UNITED AIR LINES represents the best money can buy; every minute detail for the travelers' safety, comfort, pleasure and swift transportation has been incorporated into this speedy plane. Its cost is about \$1,750,000. Each individual turbo-compound engine, and there are four of them, costs some \$65,000.00 and they offer the traveler a cruising speed of 365 mph. We are proud, indeed, that our company's regulators were selected a component of such an outstanding selection of construction parts as comprise this marvelous product of the engineering and construction genius of the Douglas Aircraft Company. You, too, are fully justified to place your confidence in these fine pressure regulators which today serve the most critical buyers.



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539 DEPT. 140

Still another Western opportunity

THE OPPORTUNITY to do a better job, management-wise, is certainly greater in the West than it would be in a staid, fixed organization such as some of those in the Middle West and East, according to Frederick B. Whitman, president of the Western Pacific Railroad Co. As an observer who only comparatively recently came into the Western picture and therefore should have a reasonably detached point of view, his remarks along this line to the California Personnel Management Assn. warrant attention.

"In the West we have two other favorable features for our business climate. One of them is the democratic spirit of the West as compared with some other areas of the country. We don't have that autocratic, artificial respect for authority as such as exists in other parts of the country, because the very nature of our population and social structure is more democratic.

"True, we do have the proper respect for management when management deserves that respect. On the other hand, because of our more democratic ways, we have better opportunities for a foreman being able to talk to workers, a sales manager to talk to salesmen, and vice versa. This greater ease of communication both ways provides a favorable influence in trying to do a better job in developing management skill.

"Secondly, in the West we haven't forgotten the pioneer spirit. Because of the opportunities for continual expansion, there is plenty of room for pioneering spirit in all phases of management. There is a willingness to accept new ideas and new methods rather than a closing of minds to the fact that there are ways and means of doing a job better."

Natural gas decision

"WHAT THE PACIFIC NORTHWEST really needs is a cheap Btu," observed one of the leading electric utility executives in that area very shortly after the war. We do not pretend to know just how cheap the Federal Power Commission's approval of natural gas from Texas will make Btus, but the main thing after all is that the commission finally has decided to let it come to the Northwest, regardless of where it originates.

It may take several years for its effect upon industry in the West to be felt, but the advent of natural gas cannot help being a stimulant to the whole industrial economy of the West.

While the FPC opposed gas from Canada because a foreign country would then be the source of supply, we feel very definitely that the growth of the area will ultimately require additional gas. This in all probability will have to come from Alberta, unless adequate sources are revealed in Montana or Wyoming. We feel this would be highly desirable simply as a means of cementing closer ties between the United States and Canada. After all, oil is being piped across the border from British Columbia to Washington without any objections being raised.

What kind of education?

IT SEEMS TO BE quite easy for industry and the schools to get together to arrange for technological courses, but how often do they meet to ascertain what the fundamental need is in regard to education?

The first meeting of that kind we have encountered is one of the sessions of the Northwest Wood Products Clinic at Spokane last April. Speakers from the wood products industry and several of the universities in the Inland Empire discussed the questions of whether students are being properly educated and the needs of industry properly voiced. The outcome was the formation of a joint committee to explore the subject further and report back at the 1955 Clinic.

Some representatives from industry wanted specific training; others felt the real need was more thorough grounding in fundamentals. It was refreshing to hear how thoroughly aware the university people were of the need for students to be able to think and express themselves clearly.

Who is responsible, industry or education, for acquainting the young generation with what is expected of them and what opportunities lie ahead? Obviously no exact line can be drawn, but perhaps the committee can make it more clear than it is now.

As for the frequent complaint that the young people of today are primarily interested in retirement, pensions, and other security features, rather than in opportunities, the educators attributed it to the fact that the former things are the ones discussed in the home. Perhaps industry has been backward in regard to this.

FIBRE DRUMS? STEEL SHIPPING CONTAINERS? STEEL EQUIPMENT CONTAINERS?

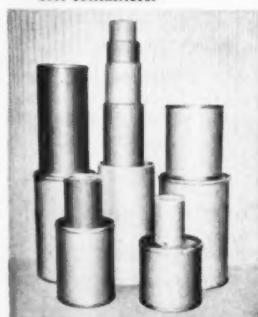
RHEEM Announces a Complete Line of Fibre Drums to Provide an All-Inclusive Shipping Container Service

To supplement its line of steel shipping and custom equipment containers, Rheem has added a complete line of Fibre and Fibre-Metal drums. These strong, light weight, inexpensive drums come in four types and in a wide variety of sizes.

Choose the Drum that Fits Your Needs



Choose the type that best fits your needs — All-Fibre drums, or Fibre-Metal drums with steel bottoms with either slip or friction covers or with the new, easy to install and remove Rheem-Lox ring. Only Rheem offers all these types of low cost containers.



Choose the Size that Fits Your Needs

Choose the size that best fits your needs. Fibre drums from 1- to 32-gallons in capacity; Fibre-Metal drums from 5- to 60-gallons. There is virtually a size for every possible requirement.

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**NOW, More than ever before, You Can Rely On
for all your shipping container requirements**



GET THEM ALL... GET THEM FAST...

from

RHEEM

RHEEM STEEL CONTAINERS ARE MADE IN SEVEN STRATEGIC LOCATIONS



Rheem Fibre Drums are being manufactured in four of these plants. Production lines are scheduled for installation in other plants soon.



"FAMILY" IDENTIFICATION

Rheem can furnish on Fibre drums the same type of decorative service it provides users of Rheemcote lithographed steel drums. Any design or trade mark can be reproduced on an all-over label for Fibre drums in any number of colors to provide "family" identification for your products.

**MAIL COUPON
NOW!**

RHEEM MANUFACTURING COMPANY (Mail to Nearest Sales Office, Listed at Left)

We would like to have your packaging engineers come to our plant and study our shipping container problems.

Please send additional information.

NAME OF COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

BY _____

Editorial request

Editor, WESTERN INDUSTRY:
Kindly forward us six copies of the page containing the editorial "Demonstration Beats Legislation" which appears on page 28 of your March 1954 issue.

Your prompt attention to this request will be appreciated.

H. G. MURDOCK,
Secretary
Southern California Tool &
Die Assn., Los Angeles

Water info wanted

Editor, WESTERN INDUSTRY:
Would you please advise me where I might secure a copy of a booklet entitled "Quality and Treatment of Water in the West" consisting of a series of articles written by Ray W. Hawksley and published in your magazine?

J. J. MCKINNEY
J. J. McKinney Co.
Portland, Ore.

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Executives the choice

Editor, WESTERN INDUSTRY:

Would it be possible for me to obtain a copy of the article by James T. Lang beginning on page 78 of the May 1954 issue of WESTERN INDUSTRY?

J. M. SHULMAN
Motor Engrg. Section Mgr.
Westinghouse Electric Corp.
Sunnyvale, Calif.

(This article was entitled "How To Choose Your Next Executive" and dealt with the need for a thorough and well-planned approach to the problem, instead of the all-too-frequent hit-or-miss proceeding.)

Editor, WESTERN INDUSTRY:

We have found the article "How To Choose Your Next Executive and Get the Man You Want" by James T. Lang on page 78 of the May 1954 issue of WESTERN INDUSTRY very helpful. Would it be possible for us to receive five reprints of this feature? Thank you very much.

SPENCER J. HAYDEN
Director of Training
Metal & Thermit Corp.
New York

Quality Control in demand

Editor, WESTERN INDUSTRY:

The May 1954 issue of WESTERN INDUSTRY has been reviewed and I am desirous of obtaining twenty copies of the article entitled "Quality Control—A Tool for the Small Shop Too."

We are interested in obtaining literature of actual experience of Quality Control as it is known today in order that we might bring these stories to our own suppliers.

Your assistance in the above matter will be greatly appreciated.

W. P. SCHWAGER
Manager
Statistical Quality Control Department
Guided Missile Division
The Firestone Tire & Rubber Co.
Los Angeles

When the specifications call for GEARS



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Gear Grinding



Whether you're building aircraft for the nation's defense or machines to speed modern industry, you will find the right answer to your gearing problems at ADVANCE Gear & Machine Corp. Whatever your need . . . gears, gear products, or intricate gear assemblies, ADVANCE is qualified to help you.



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ADVANCE engineers are gear specialists. They have the know-how of interpreting your gear requirements and come up with the right answer. This is a part of ADVANCE service that is helping many firms solve tough gear problems. Perhaps it can help you also.

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How Day & Night makes water heaters from USS Steel Sheets



Pressure-testing of the 12-gauge steel shell (left) is one of the early steps in the manufacture of glass-lined water heaters. A hydraulic test pressure of 300 lbs. psi is applied. In the outlined photograph (above left) light gauge sheets are being pressure-seamed to make the outer jacket. Day & Night is a division of Affiliated Gas Equipment, Inc. At full capacity, this Monrovia, California plant produces approximately 5000 units per week.



On the assembly line heavy Fiberglas insulation is put around the shell and the outer jacket is dropped down around it. One feature of this Day & Night water heater is its Jetglas lining. It is similar to the coating used in jet fighter engines and, in addition, is impervious to the chemical action of hot mineral-bearing water.



Mr. W. J. Bailey, Jr. (left) General Manager of Day & Night, inspects a completed water heater with Mr. A. J. Horn, General Sales Manager. The finished product is just one of the many examples of United States Steel at work. From start to finish . . . from open hearth to rolling mill . . . steel from USS is designed to do the best job for you. For additional information or technical assistance, call your nearest Columbia-Geneva District Sales office.



USS Steel Sheets

United States Steel Corporation • Columbia-Geneva Steel Division

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Please send me your free wall chart showing weights, standard sizes, and gauges of Steel Sheets.

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STACKING UP SOLID SAVINGS!

Handling brick and tile was a costly, time-consuming job for a leading producer of clay products. Now, with Towmotor **Mass Handling**, every pallet of brick moved means a *solid saving*!

It's an idea for you to consider. Find out how Towmotor **MH** can help solve the costly production, storage, shipping and receiving problems in your plant. Your boss will like the idea. Write for booklet, "How To Catch Man-Hour Thieves." **TOWMOTOR CORPORATION**, Div. 6707, 1226 E. 152nd Street, Cleveland 10, Ohio.

CALL YOUR LOCAL TOWMOTOR REPRESENTATIVE
For fast service and the name of your
nearest TOWMOTOR Representative, see the
Yellow Pages of your telephone directory.



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FORK LIFT TRUCKS and TRACTORS

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CALENDAR OF MEETINGS

JULY 13-15—*Western Plant Maintenance Show and Conference*, Los Angeles. Show at Pan-Pacific Auditorium. Conference at Ambassador Hotel. Contact W. J. Wilkin, Clapp & Poliak, Inc., 759 Monadnock Bldg., San Francisco 5.

AUG. 9-10—First Annual Western Regional Conference, *American Society for Quality Control* (in conjunction with Aircraft Technical Committee), U. S. Grant Hotel, San Diego. Contact: Ed Caldwell, Quality Control Division, Convair, San Diego.

AUGUST 17-19—*Western Packing & Materials Handling Exposition*, Civic Auditorium, San Francisco. Contact W. J. Wilkin, Clapp and Poliak, Inc., 759 Monadnock Bldg., San Francisco 5.

AUG. 25-27—*Western Electric Show and Convention*, Los Angeles. Show at Pan-Pacific Auditorium. Convention headquarters, Ambassador Hotel. Contact M. Mobley, Jr., 344 N. La Brea Ave., Los Angeles 36.

SEPT. 20-21—*Pacific Northwest Industrial Health Conference*, Multnomah Hotel, Portland. Contact conference headquarters, 824 S. W. 5th Ave., Portland.

OCT. 6-8—*Edison Electric Institute*, Hotel Sir Francis Drake, San Francisco. Contact C. Baugh, Pacific Gas & Electric Co., 245 Market St., San Francisco.

OCT. 8—*Washington Assn. of Operating Millers*, state meeting, Davenport Hotel, Spokane, Wash. Contact W. W. Liley, 1211 E. Sprague Ave., Spokane.

OCT. 25-27—*National Lubricating Grease Inst.*, San Francisco. Contact H. F. Bennetts, executive secretary, 4638 J. C. Nichols Parkway, Kansas City 12, Mo.

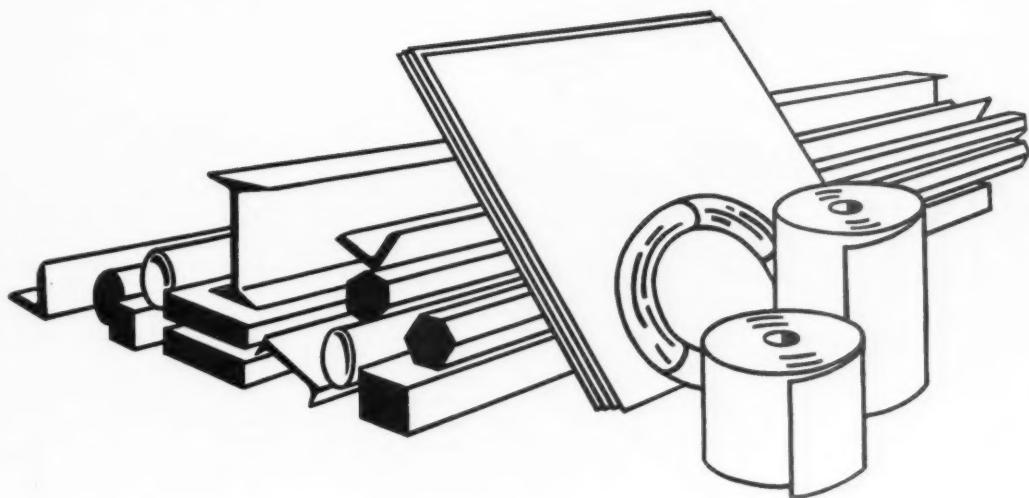
DEC. 3-4—*Northwest Mining Assn.*, Davenport Hotel, Spokane, Wash. Contact Association, MA 4822, Spokane.

1955

JAN. 12-15—*World Symposium on Applied Solar Energy* under leadership of Stanford Research Institute, Westward Ho Hotel, Phoenix, Ariz. Contact M. L. Kastens, SRI, Stanford, Calif.

JANUARY 27-28—*Fruit and Vegetable Sample Cutting for Canners League of California*, Fairmont Hotel, San Francisco. Contact M. A. Clevenger, 215 Market St., San Francisco.

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in the right place
at the right time!



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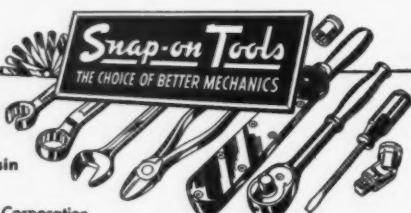
* **Snap-on** MECHANICS STANDARD SERVICE SET

● No time lost hunting *the right tool* when this carefully planned Snap-on set is at hand. No time-wasting "make-do" with sloppy misfit tools! Each of the 166 tools in the set is a basic in handling operations most frequently encountered in all types of maintenance work. In orderly arrangement in the big six-drawer chest, they are *safe*, and right at the finger tips when needed. Available through your nearby Snap-on factory branch. For free 104-page catalog of 4000 Snap-on hand and bench tools, write

**SNAP-ON TOOLS
CORPORATION**

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*Snap-on is the trademark of Snap-on Tools Corporation.



THIS MONTH'S COVER

WESTERN STEEL

keeps pace with the West

A GLANCE at statistics shows close correlation between growth of the West and the increase of its steel producing capacity. During the war years when steel was urgently needed for production of arms, munitions, ships and the like, new steel mills sprouted in the West and existing mills increased capacity. This was a period of enormous expansion.

Then, following the war and a general reorganization and reorientation of industry, the West took off on another spurt of industrial activity—an activity that continues today in a still growing but more thoughtful and orderly fashion. With this second industrial boom came still more steel mills and further expansion of existing producers.

Now, with mills producing at something less than capacity, mills and distributors alike are turning towards improved service to increase sales.

An important step in the postwar development of new techniques for fabricating stainless steel is the fabrication and heat treatment of long lengths of large diameter stainless steel pipe at the Berkeley, Calif., plant of U. S. Steel Corporation's Consolidated Western Steel Division. The 36-in. pipe, fabricated from heavy stainless steel plate, is being used in a severe corrosion application at an Atomic Energy Commission project. Special handling techniques have been developed to avert distortion in the pipe liable to result from the high temperatures required in post fabrication heat treatment.

United States Steel's Consolidated Western Steel Division located in Berkeley, California



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LEADER IN STEEL BUILDINGS

Soulé Standard Steel Buildings, with rigid steel frame, corrugated steel sides and roof, steel windows and doors, cost as little as \$1.25 per square foot—including erection on your site! Trained Soulé crews install the building, guaranteeing you a trouble-free, workmanlike job. You have a building tailored to your needs, at lowest cost and in shortest time.

Up to 40% savings over slow conventional construction

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Widths 32 to 80'; Lengths multiples of 20'; Eave heights 10 to 20'

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SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail Box 188, Emeryville, California. Phones: OLYmpic 3-2933, ENterprise 1-0176.

SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: SEneca 2300.

SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: KEystone 9311.



AMID LUNCH PAILS AND BLUEPRINTS the labor saving committee ponders problems of efficiency on the current

batch of fluorescent lighting fixtures. It meets one lunch hour a week. Employees share profits they make possible.

EMPLOYEES HELP MANAGE

EVERY man and woman in the plant gets a chance to share the wealth and run the business under a simple plan set up at Leadlight Fixture Co., division of Oakland Engineering Co., Inc., Oakland, California.

Surrounded by blue prints and lunch pails, employees gather around a work bench every noon to consider the job under way and present recommendations for improving it, thus boosting their share of the profits.

This program, adopted by the manufacturer of a wide range of fluorescent lighting equipment just seven months ago, has already stirred up enough constructive ideas to justify its existence for some time to come. Owner-president Milton Kosman, who helped to evolve the plan, says that the novelty has worn off and the system has become accepted as a

necessary and valuable part of the firm's standard operations.

Costs cut, profits shared

Embracing both profit sharing and management participation, the new program has been unusually effective, resulting in increased production, lowered labor costs and an awakened employee awareness of problems faced in today's competitive Western markets. Under the profit sharing end of the program, key personnel are given 25% of the profits before taxes. Another 8% of the profits is divided among remaining employees.

Examples of the results of allowing employees to "think for profit" are:

1. Recommendation to standardize clips as far as possible and produce them from adjustable dies.

2. A complete overhaul of the plant layout and positioning of machines particularly in the fabrication dept.

3. A complete change in warehousing of cartons.

4. Standardization of numerous small parts.

5. Redesign of the firm's LA line of lighting fixtures, resulting in improved quality and a reduction in labor costs by 35%.

6. A new system of small parts storage.

7. Purchase of new tools to facilitate production of lighting fixtures.

Although no one specific example is particularly dramatic, the cumulative effect of the program has increased productivity per employee by 30%.

The management participation pro-



... EMPLOYEE COMMITTEES DEVISED THESE
On the right, a mobile die rack feeds 4 and
8 ft. dies into working position without lift-
ing or carrying. On the left, a rolling die
rack carries smaller dies for blanking holes,
slots, and notches right up to any machine
in the plant.

gram consists of a series of regular meetings of the firm's entire staff of 26 persons and meetings of the seven committees into which they are divided. These committees are (1) labor saving; (2) quality control; (3) product design; (4) plant layout and maintenance; (5) safety; (6) procedures; and (7) auditing.

Every two weeks everyone in the firm is invited to gather together for

a general meeting at the plant. At this time, present operations are scrutinized and all aspects of the operations are considered in an effort to determine where improvements might speed production, reduce costs, facilitate tooling, etc.

In this general meeting, committee meetings for the next two-week period are scheduled and a decision is made as to which specific opera-

tions will be discussed in these meetings. Progress of the firm in general is reviewed and results of the previous two weeks committee meetings are examined.

Weekly meetings

Each of the committees, with the exception of procedures and auditing, meets once a week. Employees on a committee familiarize themselves with the topic to be discussed and with the job in process. At noon time they gather blueprints and lunchpails around a work bench in the shop and talk over the job at hand. By the time 12:30 has rolled around the committee has put down its recommendations on a three copy speed-letter.

One copy of this goes to President

This is the company

Oakland Engineering Co., Inc., was at the outset one of the flock of Western war babies, starting in 1944 as a machine shop producing parts on sub-contract. It shifted into manufacture of air cylinders that same year and continued doing so until 1953, when the line was sold to Fruitvale Machine Works, Oakland, Calif.

In 1946 the firm went into production of juvenile wheel goods and in 1949 set up what later became Leadlight Fixture Co. to manufacture fluorescent lighting fixtures. The company has now settled into the production of a broad line of commercial and industrial fixtures which are being distributed to all parts of the United States, Hawaii, and Alaska.

Here are the committees

Labor Saving

Foreman: Fabrication & spot welding (chairman)

Foreman: Paint room & assembly

Lead lady: Assembly

Set-up man: Fabrication

Quality Control

Foreman: Paint room & assembly (chairman)

Sales manager

Maintenance man

Journeyman spray painter

Set-up man: Spot welding

Assembler: Wiring dept.

Foreman: Fabrication & spot welding

Product Design

Design engineer (chairman)

Foreman: Paint room & assembly

Set-up man: Spot welding

Purchasing agent

Set-up man: Fabrication

Plant Layout & Maintenance

Maintenance man (chairman)

Set-up man: Spot welding

Foreman: Paint room & assembly

Journeyman painter

Lead lady: Assembly

Assembler: Wiring dept.

Journeyman painter

Foreman: Fabrication & spot welding

Procedures

Sales manager (chairman)

Office manager

Design engineer

Foreman: Paint room & assembly

Plant manager

Audit—Composed of a rotating committee

... EMPLOYEES SPEEDED THIS UP

Employee study of wiring and fabrication on this assembly line eliminates unnecessary operations and speeds production. Under firm's incentive plan, employees seek rather than avoid labor saving devices because they realize that production efficiency directly benefits them.



Kosman, a second is kept by the chairman of the committee, and the third goes through processing until the recommendations are adopted or rejected. This last copy goes to one of three departments, engineering, purchasing, or maintenance.

The systems for the procedures and auditing committees are the same, but meetings are held just once a month.

Committees are made up of about five members selected from various departments of the plant. Committee chairmanship usually goes to the individual who is responsible for the operation of the particular department in the plant.

Some persons, such as the foreman of assembly, are found on several committees because of their importance in many aspects of the business. Employees are encouraged to take part in the management participation program, but are not required to do any more than they wish.

How it works

Suppose at one of the general meetings it was noted that fabrication of a particular lighting fixture was going rather slowly. The problem might be assigned to the labor saving, quality control, or product design departments, or perhaps to all three.

The job would be examined at the next committee meeting and it might be found that a slight change in design would allow considerably more rapid assembly. Recommendations would be made for the change in design and if the design was feasible and the quality of the piece maintained, the recommendations would, in all likelihood, be adopted.

Committees will rotate

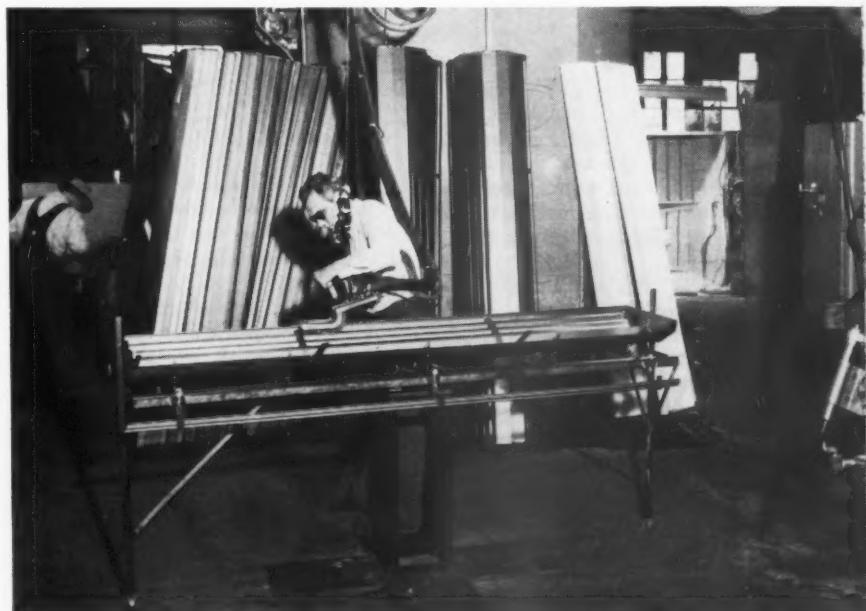
After six months, the group will re-examine the results of the program

and rotate personnel into new committees.

"Employee participation in management works thoroughly, even down to such minor phases as better housekeeping in our shops," says Mr. Kosman. "Literally, the programs we have in effect have resulted in greater job security for everybody, from the most recent employees to myself, for with employee committeemen having definite executive responsibilities, everybody is made aware of our problems."

... INCREASE PRODUCTION THEMSELVES

Labor saving committee studies resulted in the design and construction of this new welding jig which gives more accurate alignment of fluorescent fixture components and increases production by 97%.





LEFT: Mobile recording equipment makes for a fast, accurate inventory at Convair, San Diego. The chest microphone leaves stock taker's hands free.



ABOVE: Transcribing machine operator listens to the playback, then punches stock number and count directly onto punch cards.



LEFT: A cable, 150 ft. long, allows the inventory taker plenty of room to move around. The cable also serves a flashlight for working in dark corners.

HOW TO

take writer's cramp out of inventory

WHEN inventory time rolls around at Consolidated Vultee Aircraft Corp., San Diego, hardly a shudder rolls through the ranks of those who do the work, thanks to a system of recording machines which replace the drudgery of pencil pushing systems.

Convair's talking inventory, the first of its kind used on a large scale in the aviation industry, has knocked 40% off overall inventory costs and reduced time spent by 60%. Size and complexity of the company's aircraft manufacturing facilities make it necessary to divide the plant into 36 areas, each scrutinized separately.

How it works

Just before the items in a given area are scheduled for inventory,

they are checked for packaging and sealing, and identification tags indicating the volume and unit of measure are attached to the stock so as to block a shelf or bin from further use.

The inventory taker, using a portable recording machine, makes his rounds along the warehouse aisles, recording the data on the identification tags by speaking into a small chest microphone attached to the recorder by 150 ft. of cable. A flashlight line is attached to the cable, enabling the inventory taker to cover dark corners easily.

Completed recording belts are lifted from the machine and taken directly to the key punch room, where girls using a transcribing machine key punch the information onto IBM cards.

Punch cards are fed into an IBM

sorting machine, where they are summarized and the results converted back into numbers. Cards are then forwarded to the material control section where they are checked by matching them against control records. Any discrepancies in the physical count are compared to the records if they fall above a certain predetermined minimum error. A recount is done and necessary adjustments are made according to the reason for the discrepancies.

The wind-up

The inventory is completed when the cards go back to the material department for record correction and a summary of information has been supplied to the accounting department for a dollar value comparison.

PRODUCTION and ACCOUNTING

BURY THE HATCHET

Result: cost control that does the job

COST CONTROL at Heckethorn Manufacturing & Supply Co., Littleton, Colo., involves many things but most of all it is teamwork between the accounting and production departments.

"All of us are trying to hold costs down," explains Larry Zuk, cost analyst for this manufacturer of rocket shells, automobile shock absorbers, and hose couplings.

Two key reports prepared once a week by the accounting department are the foundation for Heckethorn's cost control system. They are:

1. A cost report detailing the preceding week's costs in each factory operation. This report lists the costs in comparison with an annual budget that is adjusted quarterly.

2. A labor efficiency report showing the productivity per man hour in each operation compared with a set of predetermined standards.

Weekly cost reports have proven very reliable and have been found to vary less than 3 per cent from the final monthly reports. Costs are budgeted monthly, a year in advance, and are adjusted each quarter.

Labor analyzed weekly

Labor is analyzed in detail on the weekly reports, with efficiency reported in a number of classifications. Department clerks prepare in long-hand a department report listing each person by time clock card number, total hours worked, hours devoted to each particular function and also time spent on tooling and maintenance, if any. The total working hours reported are reconciled with the paymaster's record before preparation of the efficiency reports.

The efficiency report is prepared from a group of accounts—on the key punch cards—indicating the type of work done by the employee. Included are direct productive labor, inspection, machine maintenance, tooling, engineering, factory clerical work, materials handling, and inventory. There

are also accounts recorded on the punch card that list re-inspection as distinguished from original inspection and salvage work as contrasted with routine production.

There is a further break-down on the accounts. For example, in the productive labor account the key punch cards also record whether the labor was on shock absorbers, rockets, shells, hose, or couplings. Similar detailed break-downs are made on the other accounts.

Each department scrutinized

Labor efficiency reports show each department's operations in sufficient detail to pin-point any lag. Workers in the section that is lagging quickly take corrective steps themselves because a decline in efficiency directly affects their bonus.

Comptroller R. J. Kaiser directs the preparation of both reports, which are completed each Wednesday afternoon and cover the previous week's operations. Reports are ready for study by top management at Thursday morning conferences. These conferences are held weekly.

"These reports permit us to take corrective action within a week if costs are getting out of hand," says R. E. Duboc, executive vice president

in charge of research and manufacture. "It used to take 45 days to find out how our costs were running. Now we know how things are going in a matter of a few days. With such keen competition on every product, cost control is so important that we couldn't run a factory nowadays without it."

Copies of the labor efficiency reports are circulated to all foremen and supervisors. They know at a glance how their workers are doing and they can straighten things out in a hurry if things are lagging.

Finished labor efficiency reports list the number of hours spent on particular operations and convert these into percentages of the pre-determined standard which is based on past experience.

Every possible cost is included in the cost report because "there's no value to cost control unless we include everything. If we are going to control costs, we've got to control them all," Kaiser reports.

"Overhead costs are budgeted because it might be tempting in some departments to list under overhead costs something that should be charged somewhere else—possibly to labor. We try to be as specific as possible by identifying costs by the piece,

A RACE TRACK records production efficiency in the various departments at Heckethorn. Pay-off production for the month shown indicates that workers received 18.8% above normal wages.





PLACARD, prominently displayed on metal working machine, cautions operator as to loss from waste and scrap. Slogan reads: "For each dollar wasted we have to sell \$20 worth of the product to make up for the loss."

by operation, by labor, overhead, job orders, transport, etc."

Control of job orders during the past year has been especially effective in giving more specific information on exact costs. Suggestions or requests for better methods of doing a job are assigned to the centralized planning department, where they are assigned to engineers who make studies and prepare preliminary estimates.

The job order is then referred to production management for approval and decision as to whether or not it will do the job economically. One job order may entail the making of as many as 100 tools, gauges, and other equipment in the company's tool department. When the project is completed the accounting department compares the costs of making the tools and other operations in the job order with costs of purchasing tools from outside firms.

Pay incentives

Heckethorn's pay incentive plan is another key ingredient of the cost control system. It enables the more efficient groups of workers to increase their pay checks. The incentive pay plan works on a group basis. In effect, the factory is made up of small teams of workers, each rated on its efficiency against pre-determined standards. Members of each team receive equal bonuses based on the team's showing. Bonuses each month vary but they generally range from 18 to 24 per cent above base pay.

While the accounting department

keeps a constant check on costs and labor efficiency, workers in the factory also initiate action to hold costs down. Zuk reports two typical results of the factory workers' desire to step up efficiency and cut costs:

1. A screw machine was rated by

the manufacturer as requiring 38 seconds to bore a steel rod for a shell casing. Employees experimented and cut the operation to 19 seconds.

2. In place of cutting oil costing 29 cents a gallon, the workers found a suitable substitute with a soluble oil costing less than 5 cents a gallon.

"We're not afraid to try something new," Zuk says. As an example he points to a concrete mixer being used for tumbling parts in the shock absorber department. The small mixer cost about \$75 and it does the job of a tumbler costing \$250 or \$300.

In another section of the shock absorber department, an ordinary restaurant electric deep fryer is being used for bonding nylon parts to aluminum.

Scrap reduction and salvage control are other major parts of the drive on costs. Small placards on machines remind the operator of the cost of the parts which might be damaged or reduced to scrap by improper handling at that particular machine.

Inspection time has been cut in half by a campaign that features the slogan: Don't wait for inspection—catch your own rejection. This slogan was the \$50 prize winner in a recent scrap reduction drive launched with whole-hearted co-operation of the labor union.

Another feature of this campaign

SUMMARY OF WEEKLY LABOR REPORT

Date Prepared:

April 29, 1954

% of Efficiency

4/19 through 4/25/54

Department	O.H.	Shocks	Hose C'plings	Shell	Rocket	Rew'ked Rocket	Special	Total Dept. Eff'cy.
Shipping & Rec'g								
Material Control	101	112	500	98	145	M. 91	...	105
Maintenance	92	95	71	130	128	M. 152	45	101
						F. 82		
						H. 77		
Engineering	154	22	96	286	74	M. 159	135	118
						F. 86		
						H. 87		
Inspection	157	116	56	126	104	M. 60	38	91
						F. 36		
						H. 34		
Tooling	152	87	209	110	119	M. 124	44	104
						F. 67		
						H. 62		
Gridley	118	87	...	98	123	...	...	110
Rocket	109	39	...	...	98	M. 100	...	90
						F. 54		
						H. 51		
Shock	103	104	...	...	100	...	...	104
Heco Prod. Div.	38	140	...	...	...	...	...	60
Multipurpose								
Shell Line	...	...	...	124	...	...	...	126
Total Prod. %	108	98	135	114	106	M. 100	41	
						F. 54		
						H. 51		
TOTAL FACTORY %	...							97

was a new Mercury automobile, parked outside the factory entrance and emblazoned with a banner saying that the losses from scrap products in a month were enough to buy three new Mercurys. "Those are the things that bring home costs to the fellows working in the factory," says Mr. Zuk.

Cost reduction is frequently discussed at weekly labor-management meetings. Both the representatives of labor and management are rotated every three months to gain the widest possible benefit from those round-table discussions.

"We've had innumerable suggestions for improved cost control out of these meetings," said comptroller Kaiser. "And lots of them come from the factory people."

Labor-management meetings have been functioning for about the last three years, their purpose being to reduce costs and improve the efficiency of the firm's operations. "Everyone realizes we're playing on the same team and we're all trying for the same results," says Mr. Kaiser.

Friction eliminated

Elimination of friction between the front office and factory sections of the plant has aided in the firm's cost cutting, Mr. Zuk says. "We got rid of the friction by explaining to everyone what we were trying to do. The factory workers understand that the close check on their work is done for only one purpose: to hold down costs and make their jobs more secure."

The accounting office "has more respect for the factory problems since it has had to prepare detailed reports on the plant operations."

A preventive maintenance program was started six months ago in another move to hold down costs and already is resulting in substantial savings. Machine operators are becoming alert to indications that permit replacement or repair of parts before a machine breakdown takes place and it is too late.

"Things like preventive maintenance enter into the whole picture because the fewer production interruptions, the lower our costs and the higher efficiency rating for our labor. Everybody makes money under that system," explains Mr. Zuk.

DON'T LOSE IT, LABEL IT



ADDRESSED LABELS are pinned to the order and routing sheet and travel with them through the entire assembly and wrapping process. Firm stocks 30,000 different items and ships about 2,000 separate packages a day to retail hardware dealers in the West.



AFTER HARDWARE ORDERS at Dunham, Carrigan and Hayden, San Francisco, pass across the desk of an expert who analyzes how many packages, and hence labels, are needed, they are sent to this battery of Addressograph units, where error-proof metal plates print necessary information on roll-fed labels supplied by Fairbairn Tape & Label Co., Inc., San Francisco.

TRUCK LOADING is the final step in the process. By this time each package is properly labeled and ready to go. This combination of automatic addressing with pre-printed, perforated rolls of labels has speeded up the firm's whole order filling set-up, improved customer relations, and practically eliminated addressing errors.



Western Packaging and Materials Handling Show

THE Western Paekaging and Materials Handling Exposition, held in San Francisco three times but staged in Los Angeles in 1952, returns to San Francisco this year, at the Civic Auditorium, August 17-19. An industrial seminar will be a concurrent feature.

Exhibit space is reported by Clapp & Poliak, Inc., managers of the event, as sold out and applications for tickets of admission as already having topped those of previous years. The 1952 show had a record attendance of 9,000.

Admittance is limited to registrants who are buyers, executives, or key personnel of firms or organizations that are specifically interested in the packaging or materials handling fields.

Tickets are bound into this issue of *Western Industry*, and additional tickets may be obtained by making use of the coupon in the advertisement on page 7 of this issue or by writing either the San Francisco office of Clapp & Poliak, 681 Market St., or the New York office, 341 Madison Ave.

Moderator of the industrial seminar on packaging will be George W. Aljian, director of purchasing and packaging, California & Hawaiian Sugar Refining Company, while Professor Samuel Rubin, head of the transportation department, University of Southern California, will conduct the materials handling session. These will be closed meeting panels on August 18, which will report their conclusions later.

Exhibitors List as of June 29, 1954

A

Acme Steel Company
R. D. Adams Company
Aero-Coupling Corporation
Allied Manufacturing & Sales Co.
American Partitions Co.
Div. Clinton Foods, Inc.
Ames Harris Neville Co.
Anthony Company
The Arabol Mfg. Co.
Archer Label Company
Automatic Web Control Mfg. Co.
Avery Adhesive Label Corp.

B

The Baker-Raulang Company
Bemis Bro. Bag Co.
Better Packages, Incorporated
Big Joe Mfg. Co.
Biner-Ellison Machinery Co.
E. L. Bivans, Inc.
Horace Blackman Company, Inc.
Peter D. Bowley & Associates
R. M. Bracamonte & Co.
E. C. Buehrer Associates, Inc.
Howard Burt & Sons
The E. W. Buschman Company

C

C & D Batteries, Inc.
Celanese Corp. of America
Central States Paper & Bag Co., Inc.
Ralph Chaffee & Company
Clark Equipment Company
Industrial Truck Division
Cleveland Container Company
Colson Equipment & Supply Company
Continental Can Co., Fibre Drum Div.
Crown Zellerbach Corp.
Western Waxed Paper Division

D

Daher Co.
Holland Box Div.
Derby Sealers, Incorporated
Detecto Scales, Inc.
Dobekmum Company
E. I. du Pont de Nemours & Co. Inc.
Durethene Corporation

E

Eastman Kodak Company
Ray T. Ebert Company
Electric Sorting Machine Co.
Electronic Processes Corp.
Elliott Mfg. Company
Errich International Corp.
Evans Container Corp. of Los Angeles
Evans Products Company

F

Fairbairn Tape & Label Co. Inc.
Fibreboard Products, Inc.
Dave Fischbein Company
Food Machinery and Chemical Corp.
Fulton Bag & Cotton Mills

G

A. J. Gerrard & Co.
The Globe Company, Grip-Strut Division
Globe Container Company
Good Packaging
Adolph Gottscho, Inc.
Russ Grady Sales Co.
Greenwood Packaging Supply Co.

H

James C. Hale & Co.
Hammerslag Equipment Co.
Hilker Products Corp.

I

Ideal Stencil Machine Co.
International Staple & Machine Co.

K

Kaiser Aluminum & Chemical Sales, Inc.
Kaiser Nest-A-Bin Div.
Kimberly-Clark Corp.
Industrial Wadding Products
King & Anderson
King Sales & Engineering Co.

L

Lamson Corporation
Lansing Company of Calif.
H. L. Little Burner Co.

M

E. W. MacKenzie Company
Mailler Searles, Inc.

T. R. Mantes Company
Marathon Corporation
Marsh Stencil Machine Company
Martin-Decker Corp.
Mobilift Corporation
Modern Packages, Inc.
Modern Packaging
The Moto-Truc Company
Motor Generator Corp.
Multistamp Company
Mutual Plastic Mold

N

Nashua Corporation
Nasko Machinery Corp.
National Starch Products, Inc.
Pacific Coast Div.
New Jersey Machine Corp.

O

P. F. O'Donnell Company
Olin Cellophane Div.
Oliver Machinery Co.
Packaging Div. and Label Div.

P

Pacific Coast Foil Company
Pacific Waxed Paper Co.
Packmasters
Pak-Rapid, Inc.
Ira G. Perin Co.
Ralph E. Peters Company
Phillips Associates
Pioneer Div., The Flintkote Co.

R

Radio Corporation of America
RCA Victor Division
John T. Raisin Corp.
The Rapids-Standard Co., Inc. of California
Reeves Pulley Company, Inc.
Reynolds Metals Company
Reynolds Metals Co.,
Plastics Division
Rheem Mfg. Co.

S

Signode Steel Strapping Co.
Simplex Packaging Machinery, Inc.
Southern California Plastic Co.
The Squires Company
The Stanley Works
Steel Strapping Division
Sten-C-Lab Inc.
Stokes & Smith Company, Div. of Food
Machinery and Chemical Corp.

T

Tharco Container Co.
Fred Todd Company
Towmotor Corporation
Tubular Structures Corp. of America

U

Union Steel Products Company
U. S. Electrical Motors Inc.
United States Printing & Lithograph Co.
U. S. Spring & Bumper Co.

V

Visking Corporation

W

Weber Addressing Machine Co.
Western Industry
Western Lithograph Company
Westline Products Division
Wolverine Paper Converting
Machinery Corp.
Wood Conversion Company
Woodman Company

Y

Yale & Towne Mfg. Co.

FITTING glass honeycomb filler material into place over fiberglass cloth in mold. A second sheet of fiberglass cloth will then be placed over the honeycomb to form a strong sandwich. This will be held in place by a vacuum bag during the curing process. (Picture courtesy of Zenith Aircraft Division of Zenith Plastics Co.)

FIBERGLAS PLASTIC PARTS

OFFER NEW OPPORTUNITIES

... Material promises low product cost,

flexibility of design, and simple repair

By NORMAN C. PARRISH

Assistant Manager
Plastics Division
American Latex Products Corp.
Hawthorne, Calif.

THIS discussion of low pressure* glass fiber reinforced plastic parts is premised on requirements for currently accepted design criteria, established fabrication methods, and reasonable tooling practices using ordinary production techniques.

It is considered that the true meas-

ure of product design is a finished article having dependable quality, with an optimum use of available equipment and materials, all at the lowest possible level of cost. When the initial expense of experimental, or temporary, tooling is used as a measuring device, the importance of designing a unit for producibility is increased three-fold.

When the maintenance cost is reduced as well as the initial cost, then and only then does the true cost of the

article become economical. Repairs to glass fiber reinforced plastic parts are proven to be cheap, simple, and lasting, and most important of all is the

* The general classification of laminates by the fabrication is: (1) high pressure, where matched dies are employed; (2) low pressure, where matched dies may be used, but more often vacuum bags and pressure chambers are used; (3) the group using curing pressure from zero to 10 psi. (gauge pressure); these are called the contact laminates.

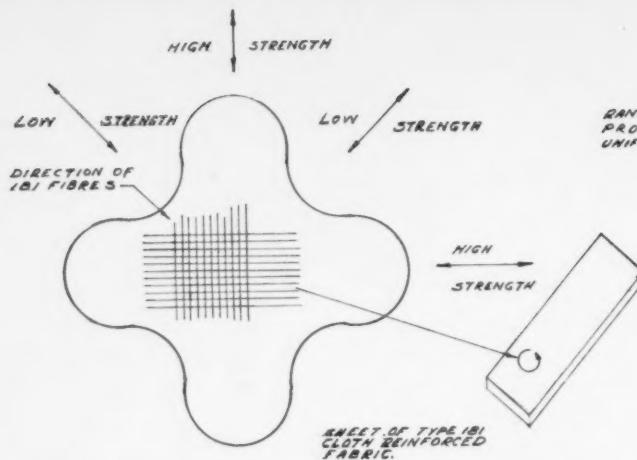


FIG. 1 (left): Typical strength pattern, Type 181 cloth laminate single ply resin bonded. Note maximum in direction of glass fibers.

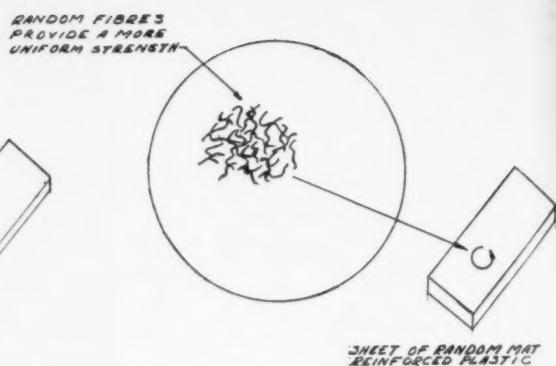


FIG. 2 (right): Typical strength pattern of random fiber reinforced laminate resin bonded. Note uniform strength in all directions.

fact that the average user can perform his own fabrication or repair work in many instances.

External configuration of most parts made of this material is such that there is more than one producibility design possibility. When the design and fabrication of an article is discussed from the aspect of cutting costs by increasing production through decreasing the number of detailed parts, when applicable, the structural use of glass fiber laminates is a simple solution.

The techniques and principles of structural design do not have the same degree of importance, based on the relationship of low production and high production, as can normally be expected when contemplating tooling for metal fabrication. The design and construction of reinforced glass fiber assemblies lend themselves in most instances to high production techniques with low production quantities.

Use of fiberglass reinforced laminates in place of metal parts is feasible in small quantities only, if the initial cost of tooling and fabrication are the only determining features. The comparative value can only be fully appreciated when the design requires light weight, resistance to corrosion, use of non-strategic materials, simple low cost tooling, and low modification (design) cost.

Parts unlimited

The number of parts in each field of application that can be made with glass fiber reinforced plastics is virtually unlimited. The primary factor that controls the structural use of reinforced laminates is frequently dictated by the tension modulus of elasticity. (The modulus of elasticity for Type 181 fiberglass cloth reinforced laminates is approximately 3.5×10^6 , as compared with 10.5×10^6 for aluminum alloys.)

It must be kept in mind when considering glass fiber reinforced plastic parts that the fiberglass reinforcement and the plastic resin form a heterogeneous unit; therefore the direction and type of glass fiber cloth must be considered as being made up of two separate materials.

These two ingredients act simultaneously, but independently. The glass fibers, being relatively strong and stiff, react differently from the weaker and more flexible bonding resin. When a load is applied to this composite structure of glass fibers and plastic, the plastic distorts more than the glass fibers, and therefore the larger portion of the load is transferred to the glass fiber strands. See Figure 1.

Advantages

1. Reinforced fiberglass laminates are suitable for low-cost tooling operations.
2. The comparative cost of the finished part is low.
3. The possibility of the first-run parts being satisfactory is excellent.
4. Complex curved surfaces can be easily fabricated.
5. Conventional design must be modified for economically satisfactory parts.
6. Flexibility of design in fiberglass can be a valuable aid.
7. Repair of damaged parts is simple.

The specific direction of the glass strands and the proportional amount of them, by volume, governs the strength of the composite structure. When the glass fiber is properly treated and adequately wet with resin, the higher the per cent of the glass content of a laminated part, the greater will be the strength of the structure.

When chopped strands, or random mat, is used, the strength pattern is essentially that of a metal, with a more similar pattern of strength and stiffness even though at a much lower value. See Figure 2.

The most beneficial characteristic

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- Air-conditioning duct systems
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- Automobile bodies and parts
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- Chemical trays, vessels, etc.
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- Doors and hoods
- Dog houses
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of the reinforced laminate is its ability to absorb shock without taking permanent set. This is due to the proportional elastic limit and the ultimate tensile values being one and the same (at the same point on the stress-strain curve). See Figure 3. The glass strands are perfect elastic members having a 3% elongation before rupture.

Metal alloys do not have this absence of yield point in common, but possess a property of becoming permanently distorted under certain circumstances, without failure. (This does not include creep, which sometimes occurs in the plastic which is used to bind the glass fibers in the laminate structure.)

Glass strands manufactured for use as reinforcement of plastics are made from low alkaline-content silica sand to facilitate the wetting of the final fibers by the plastic. They require lubricating to avoid abrasion during the process of handling or weaving.

When the weaving is completed, this lubricant is removed and the material given a treatment to prepare the sur-

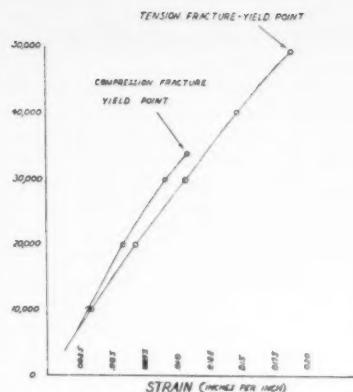


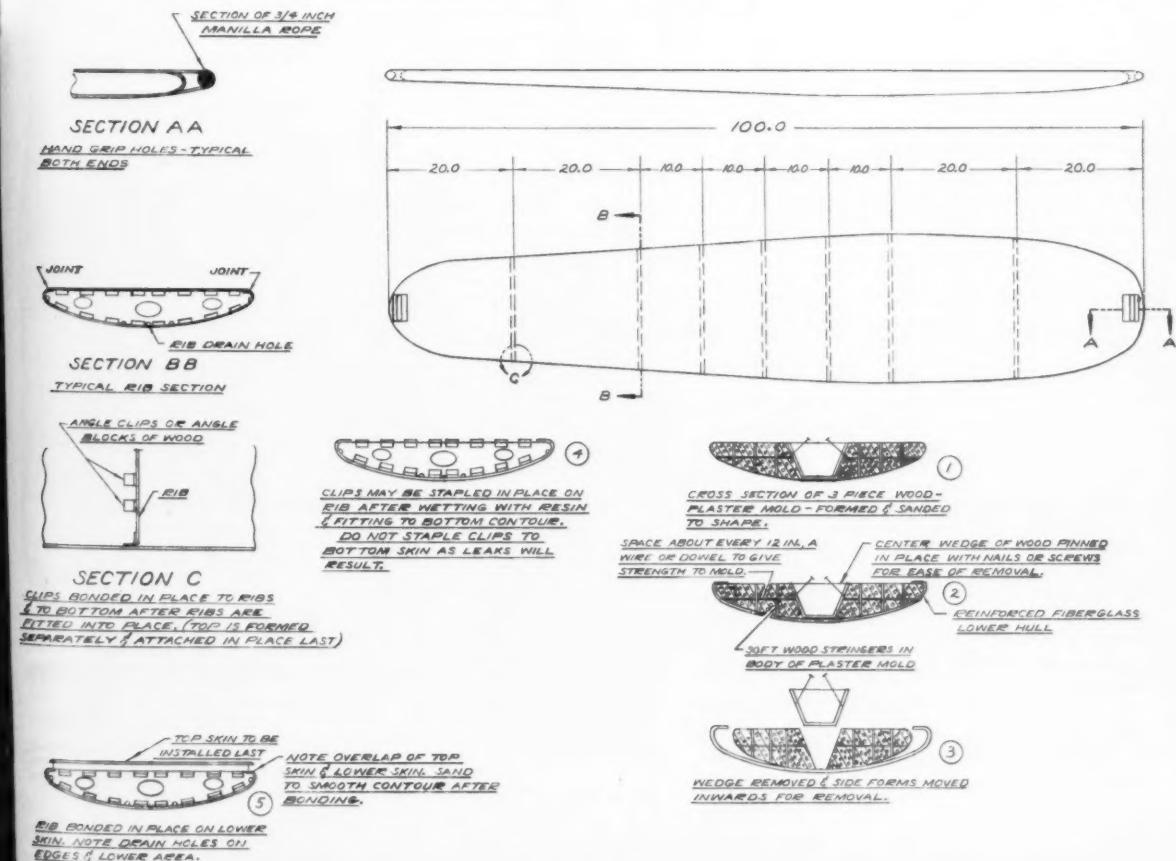
FIG. 3. Average stress-strain curve typical for Type 181 cloth reinforced laminate.

face for receiving the plastic binder. The plastic binder in most instances will adhere to the "sizing" on the fibers better than to the actual bare glass and the "sizing" adheres to the glass fiber satisfactorily to give increased strength to the composite structure.

In the application of the properties

FIG. 4. Fiberglas surfboard construction methods. This design is suggested for a single unit. If more than one is to be fabricated,

a female mold should be used to improve surface and eliminate sandings. Ribs may be eliminated if interior filled with Stafoam.



of reinforced plastics, two considerations are paramount in the choice of a fabric reinforcement: the quantity of glass, and the orientation of its strands. There are basically four types of glass-resin combinations, as follows:

1. Parallel-strand mats (Type 143).

2. A square weave fabric having the same yarn strength in two directions, both warp and fill (Type 181). Two weaves of this type are available, a plain weave and an eight-harness satin weave; the latter can be more easily draped over complex shapes.

3. "Preforms" and conventional mats of chopped roving, more widely known as "random" mat.

4. Special modified square weaves for specific applications.

The polyester or Epoxy resins are most widely used for the fiberglass binders at low pressures. The unsaturated polyesters are highly viscous liquids which polymerize (change from liquid to solid) upon the addition of catalysts (peroxides in this instance) and the application of heat (70 to 250 deg. F.). When the pres-

sure or temperature is marginal, frequently accelerators are used.

Resins used for structures requiring greater strength have the resin modified by the addition of liquid hydrocarbons such as styrene, resulting in a more complex molecular structure having greater strength. This modified structure has thermosetting properties that are desirable over the unmodified polyesters resin, and increased solvent resistance.

The polyester resins are by far the most commonly used types of binders employed in conjunction with glass fiber reinforcements. Their use has grown in popularity because of the unique characteristic possessed by them, since they give off no by-products during cure (polymerization). By various modifications of the basic polyester resins, the manufacturers have made it possible to obtain flexibility that enables the resin fabricator to adapt the material to a variety of end uses.

Two types

Two basically different types being used are styrene, as the co-polymerizing solvent, and those that employ dialyl phthalate (DAP). (These are referred to as styrene-polyesters and DAP polyesters.) The styrene-polyesters are cheaper and less viscous than DAP-polyesters, but the unused portions of the latter can be stored for longer periods of time after catalization.

Many combinations and compositions can be employed so that different physical characteristics may be obtained. In addition, the rates of change from one physical state to another during cure can be varied to suit a given

molding operation. This control is best maintained by the manufacturer of the plastic resin.

The fabricator should consider this material because it is economical for small quantity production and has a great advantage in flexibility of design. This is true primarily because extremely complex shapes can be molded economically, where conventional metal parts would have to go through a long, expensive series of fabricating operations. In many cases, the use of glass-reinforced plastics has enabled the fabricator to take advantage of the lighter weight and relatively high strength.

For greatest efficiency

In all cases where glass fiber reinforced plastics are considered, it is imperative that the product be designed around the fiberglass reinforced plastic, and that an exact copy of physical shape of the previous metal or wood parts not be attempted, if maximum efficiency is desired.

The plastic laminate is made up of impregnated layers of glass fiber material. This fibrous material may be of any form that is appropriate for the application; namely, random mat, cloth, unidirectional warp or roving. Impregnation of this material is accomplished by one of three ways: (1) drawing the resin into the material by vacuum; (2) pre-impregnation of the material; (3) forced in place under pressure or applied as the plies are put in place.

The glass fibers, in fabric form, random mat, etc., are laid up in plies with the resin usually being applied between plies. This lay-up is done on a temporary plaster mold or produc-

Physical characteristics of various glass-resin combinations

	Al. sheet 24ST-T4 clad	Fishing rod stock parallel fibers	143 fabric parallel laminated	181 fabric	Mat or preform	Polyester resin pure	Polystyrene resin pure
Glass, % by volume	....	55	50	45	25	0	0
Resin, % by weight	....	30	34	38	60	100	100
Specific gravity	2.77	1.90	1.85	1.75	1.55	1.30	1.05
Tension, psi	61,000	120,000	77,000	40,000	24,000	6,000	7,000
Flexure, psi	....	150,000	115,000	60,000	32,000	13,000	12,000
Flexure modulus, psi	10.5x10 ⁶	6x10 ⁶	5x10 ⁶	3x10 ⁶	1.7x10 ⁶	0.3x10 ⁶	0.5x10 ⁶
Compression, psi	38,000	70,000	70,000	35,000	25,000	21,000	14,000
Shear, psi	....	....	....	19,000	17,000	....	....
Bearing, psi	....	....	....	42,000	39,000	....	....
Impact strength, ft. lb./in.	70	55	25	25	0.3	0.4
Moisture, % absorption 24 hr.	0.15	0.25	0.3	0.4	0.4	0.04

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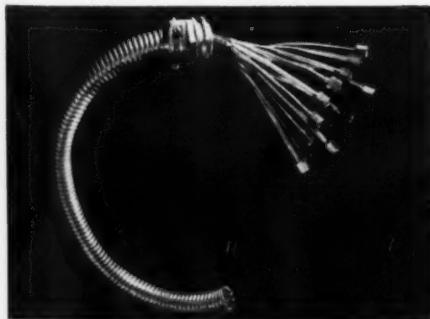
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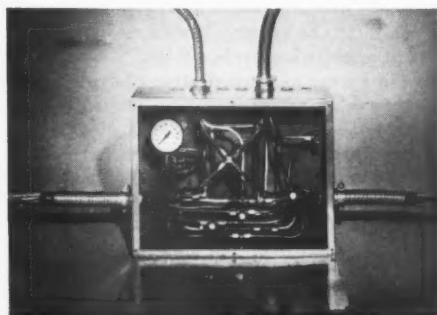
remains the same throughout the length of the cable.

The tubes usually are copper, but aluminum tubes can be used for special purposes. For unusually corrosive situations, a plastic outer sheath can be applied. As many as 19 tubes, $\frac{1}{4}$ " OD, can be cabled, and supplied in lengths up to 1,000 ft.



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Since the tubes carry not electricity but air, nitrogen, helium, or a fluid, they are especially attractive in potentially explosive locations, as in refineries and chemical plants. Utilities are also turning decisively to this new cable, while automatic process control (automation) is a rising application.



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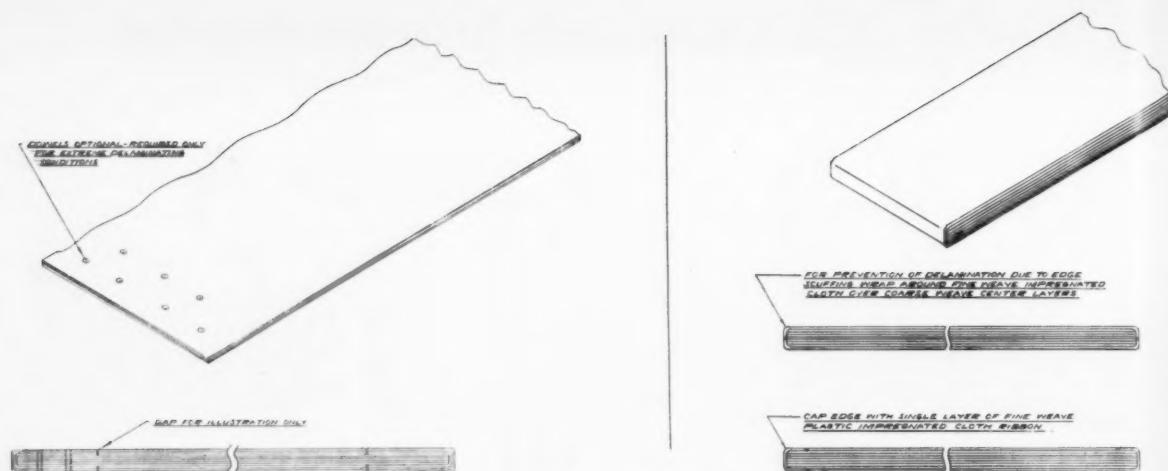


FIG. 5. Method of avoiding peel when using fiberglass cloth reinforced plastic laminate.

tion tooling. A bag or sheet with sealed edges is then placed over the structure and the air evacuated.

Curing is then accomplished by placing the jig and assembly as a unit in an oven at 200-250 degrees F. for two or more hours, depending on the thickness of the laminate and the mass of tooling. The vacuum is maintained during the curing cycle. When pressure in excess of normal atmospheric is desired, an autoclave type pressure chamber is used in order that the temperature may also be controlled.

Production tooling for parts not having undercuts is usually made of aluminum, Kirksite, steel, wood, or fiberglass reinforced laminate supported on tubular frames (and this latter surface is sometimes covered with a sprayed metal coating). For temporary tooling, plaster-of-paris is quite satisfactory for many applications.

Fabrication classification

The general classification of laminates by the fabrication is: (1) high pressure, where matched dies are employed; (2) low pressure, where matched dies may be used, but more often vacuum bags and pressure chambers are employed; (3) the group using curing pressure from zero to 10 psi. (gauge pressure); these are called the contact laminates.

With the use of room temperature cure, where no pressure is applied, either a male or female mold of plaster, wood, glass reinforced plastic or metal may be used. When room temperature curing is done, a longer curing time is required unless considerable "accelerator" is used. A bake "cure" can be used effectively to obtain higher strengths.

When a vacuum bag or diaphragm

molding technique is appropriate, the same laminating method is used, except that a rubber or plastic bag is placed over the lay-up, and partial vacuum applied within the bag. In some instances additional pressure is exerted externally by inserting the entire jig and assembly into a pressure tank. This is done for better control of the resin content and detail shape of the part.

For high production runs, it has been found desirable in many instances to use matched metal dies of Kirksite or Meehanite. However, with metal tooling, it has been found to be very unsatisfactory to include knock-out pins, as resin soon causes them to freeze in place. The use of an air blow-out hole works quite satisfactorily. However, this hole must be covered with a small piece of Scotch tape to prevent it from being plugged by the resin during the curing cycle.

The problem of material selection that confronts the new fabricator constitutes a feature problem which should be discussed with the material supplier. The fabricator will find that many benefits can be obtained by proper selection of appropriate materials, such as reduced fabrication costs, improved production performance, and better product appearance.

Use of suitable parting agents that are available commercially will prevent the part from adhering to the die. There are three general groups: (1) special parting lacquers; (2) aqueous solutions of polyvinyl alcohol; (3) special compounded "grease" lubricants. This parting agent does not inhibit the curing nor adhere to the laminate.

Fiberglass has perfect elastic properties when considered as a single strand, but when the strands are

twisted into thread, woven into cloth and bonded with resin to form a laminate, the effective elastic property must be reconsidered, as it now is a composite unit and the strength and stiffness will vary in different directions. The isotropic properties of the glass fiber are vastly different from the isotropic properties of the resin. The resultant orthotropic property can best be indicated pictorially as shown in Figure 2.

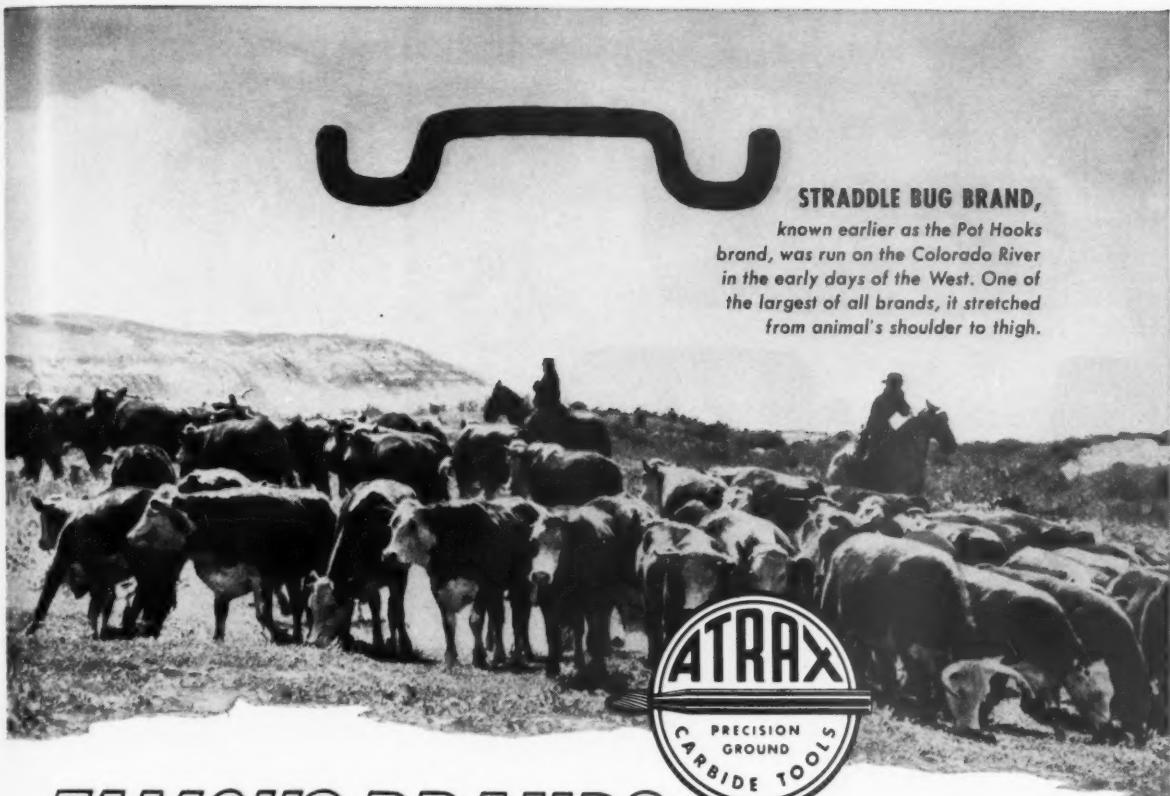
For load distribution

Due to the low elongation property of fiberglass, 2-3%, special attention must be given to attachment holes and fittings in order that the load be properly distributed without inviting failure. The direction of the laminations and arrangement of plies should be balanced to avoid warpage under temperature or load variation. The primary bonding (delamination) strength in shear is approximately 1500 psi. whereas the secondary bonding frequently does not exceed 250 psi. (for attachments to two or more parts are made by bonding after the original cure is complete).

In order better to illustrate a typical low pressure application of glass fibers reinforced plastic laminate, a "surf-rider" paddle board is shown, and detail design of tooling and steps of fabrication are illustrated for clarity. The processes reviewed for this application parallel those used for small boats, sports car bodies, and lawn furniture.

When built by the "contact" low pressure method of fabrication, the steps of the process are simple and one should not try to make them complex. The material cost of the paddle board is comparable with a

... MORE ON PAGE 68



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CONSTANT SURVEILLANCE and detailed inspection confirm the effectiveness of the plant cleaning program. (Illustration courtesy of Helms Bakeries, Los Angeles.)

THE DAY OF SANITATION ...

Sanitarians in food plants become recognized factor

By THOMAS E. COLLIER
Chairman, Food Sanitation Council
Food and Drug Service, Inc.
Alhambra, California

SANITATION now has a recognized place in food processing, as the result of revolutionary changes it has undergone in the last 15 years, and new horizons are ahead.

Designers and manufacturers have recognized these changes and are giving serious consideration to the cleaning and cleanability of food processing and handling equipment.

Your food plant sanitarian has become an integral part of the plant staff, as much so as the plant engineer or the production superintendent.

The way to this new realm was pointed out in the Federal Food, Drug, and Cosmetic Act of 1938, in Section 402 (a) (3) and (4) which states:

"A food shall be deemed to be adulterated if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food; or if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health."

Premium on sanitation

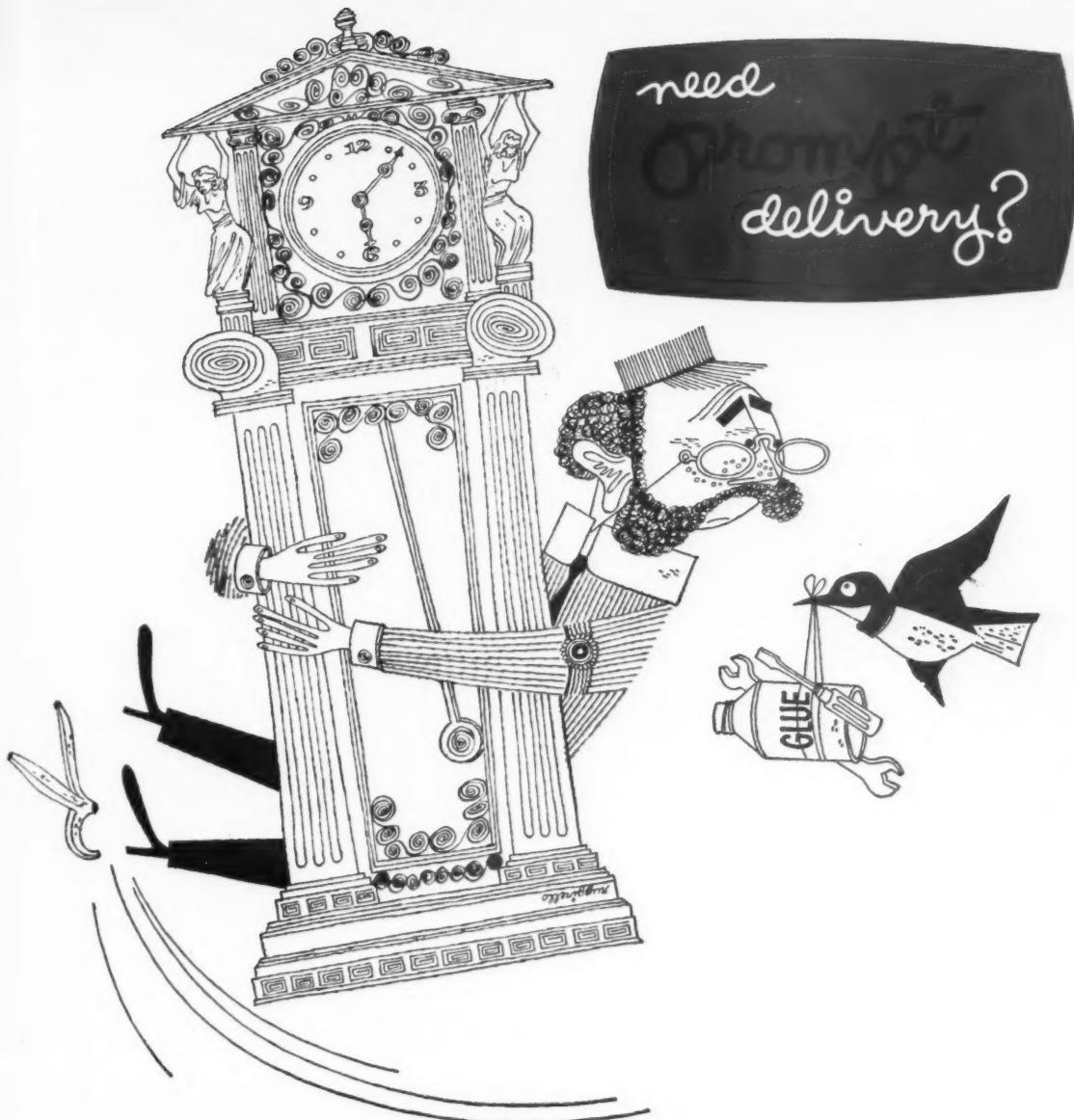
This latter provision, "prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth," places a premium directly upon the sanitary conditions being maintained in the food plant. Any insanitary condition which might possibly result in filth or any foreign material contaminating food may be legal grounds for regu-

latory action. Sanitary plant operation therefore requires the effective elimination of all such possibilities of contamination to both raw materials and finished products.

The basic definition of food plant sanitation has been well stated in the Federal Food and Drug Administration's *Microanalysis of Food and Drug Products*, which states:

"A sanitary condition, strictly speaking, is one which provides for freedom from contamination with injurious substances, particularly microorganisms.

"However, modern concepts of food and drug control undoubtedly go beyond the limited scope of this definition to encompass considerations of the maintenance of conditions which exclude the incorporation in foods and drugs of extraneous elements which are obnoxious and repulsive



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"Accordingly, an establishment operating in a manner to invite, or permit contamination of its output with

foreign matter properly classified as filth may be described as insanitary."

The average housewife takes it for granted that all the food which she buys has been prepared under proper

FOOD SANITATION COUNCIL of Food and Drug Service, Inc. Standing (from left): Ben G. Korrink, Thomas E. Collier, William E. Paxson. Seated: John S. Herr, Eric A. Gray.

sanitary conditions, and that every precaution has been taken by the manufacturer to prevent contamination of the food with such filth as bacteria, mold, maggots, worms, human excreta, rodent excreta, other animal excreta, hairs, insects, insect parts, insect excreta, trash, dirt, or any other foreign material which might contaminate the food.

The dangerous few

Most manufacturers have taken what they believe to be definite and positive precautions to insure that their food products are pure, whole-



HONOR ROLL SCROLL and the qualifications

1. Plant environs

Any condition in the area around and adjoining the plant which might have a bearing upon plant sanitation must be considered. Particular emphasis must be given to evaluating those steps being taken to discourage insect and rodent harborage or breeding in the vicinity of the plant by eliminating conditions favorable to them.

2. Plant structure

It must be sound and provide the necessary bulwark against insect and rodent entry. Constant and effective surveillance must be maintained with proper adjustments and repairs being promptly made to compensate for normal wear and tear. Adequate rest rooms and hand-washing facilities are essential. The plant must be cleanable. Proper ventilation to products.

3. Inspection of incoming raw materials

Careful inspection and examination of all raw materials are necessary. This must then be followed by the satisfactory segregation and disposal of unfit materials so that they will not afford contamination to products.

4. Storage and handling of raw materials

Proper precautions and storage conditions are essential to the safekeeping of raw materials in the plant. The surveillance and inspection necessary to insure freedom from contamination at any time prior to use are evaluated in this connection.

5. General cleaning and orderliness of plant

Cleanliness begets cleanliness, and consistent good housekeeping habits contribute favorably to the overall sanitary condition of the plant. Lack of cleanliness and good housekeeping habits

psychologically discourages desired effort and interest on the part of employees.

6. Good personnel hygienic practices

Fundamentally, human beings are not clean. Unless they have been instilled with a desire for cleanliness and a respect and consideration for others, their hygienic habits and practices are likely to be such as will result in contamination to the foods being processed or even possibly result in food poisoning. A sense of responsibility on the part of all food plant employees is a fundamental requisite of desired personnel hygiene.

7. Employee practices in the various manufacturing procedures

Clean uniforms, special equipment, and a spotless plant are of no avail if employees have not been trained to have a proper concept of food plant sanitation. The careless and thoughtless actions of employees can provide one of the most prolific sources of contamination. Their due regard for the necessity of handling and processing food so as to prevent contamination from any source is of prime importance.

8. Cleaning and cleanability of utensils and equipment

Proper steps are necessary to eliminate pockets, corners, and cracks which provide fields for bacterial development. Particular emphasis must be given to a consideration of those portions of equipment which come in direct contact with the food being processed.

9. Necessary and proper facilities for the various cleaning operations must be available

Careful study is necessary with due consideration to cost and efficiency.

10. Expedited waste disposal

Handling of waste should be such that it does not become a nuisance nor

provide food, harborage, and breeding places for insects and vermin.

11. Flexibility of the sanitation program

Scheduling and planning are essential, but the program must not be so rigid that it cannot be adapted to cope with unexpected emergencies.

12. Insect infestations, harborage, and breeding places

All possible efforts must be made to find hidden infestations, harborage, and breeding places. Once found, immediate proper steps must then be taken to correct such conditions.

13. Rodent activity, harborage, and breeding places

Rodent harborage and breeding places must not be provided in the food plant. It is of utmost importance that all such harborage and breeding places be eliminated and that careful inspection and constant surveillance be maintained to ascertain that the plant is free of rodents. If rodent activity is encountered appropriate steps should be promptly taken to free the plant of same. Pest control is vitally important and should not be placed in the hands of the incompetent.

14. Avenues of transmission of filth or other contaminants to raw materials and finished products

Both direct and indirect avenues of contamination must be ferreted out and eliminated. The extent of contamination to products is inversely proportional to the degree of food plant sanitation accomplishment in this respect.

15. Sincerity, conscientiousness, and the will to carry through on the part of both management and employees

These closely related factors are of first importance and are the basis for any successful sanitation program. Teamwork of the entire personnel spearheaded by the desire and concern of top management is vitally important and necessary. Evaluation here is the foremost index for all sanitation progress and accomplishment.

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some, and clean. However, official government reports state that the U. S. Food and Drug Administration in 1953 seized 1,228 shipments of food totaling approximately 8,750,000 pounds, of which 74% was classified as being filthy or decomposed. It is the comparatively few manufacturers and handlers of these violative products that makes one wonder.

Federal, state, and local regulatory agencies, in spite of their numerically limited staffs and inadequate appropriations, are doing a good job of enforcing the pure food laws. But un-

fortunately they cannot be in enough places enough times, and as indicated above, some food plants do operate under improper sanitary conditions.

This, in practically every instance, has resulted from the fact that qualified personnel is not available in the plant to make proper inspection and evaluation of the existing insanitary conditions. Management has thus permitted itself to be lulled into a false sense of security in that they do not have reason to doubt that their plants are operating under proper sanitary conditions.

It was with the realization that nearly all food manufacturers do sincerely desire to produce pure, clean, and wholesome foods, but that in too many instances they do not have the technical background, experience, nor time necessary to determine bacterial breeding grounds, hidden infestations, or avenues of contamination to their food products, that Food and Drug Service, Inc., was formed in January, 1947.

Qualified consultants

This independent, privately operated company is composed of a group of experienced former U. S. Food and Drug Administration inspectors and analysts with an aggregate of over 64 years' experience with the Federal Food and Drug Administration in appraising the processing of foods and the sanitary conditions under which they are prepared, packed, and stored.

With this qualified staff of inspectors, Food and Drug Service, Inc., made available to the combined food and drug industries a complete inspection and consultation service on all matters pertaining to sanitation, labeling, literature, food processing, and product control. This service has as its special purpose in the food industry to assist management in its sincere efforts to attain, maintain, and regulate a high standard of plant sanitation with the objective of producing pure, clean, and wholesome products and compliance with applicable regulations of government agencies.

In providing such an inspection and consultation service, Food and Drug Service, Inc., inspectors recognize that those matters which appear most obvious to the layman are not always the most important. A processing plant whose building and equipment approach that of a colossal show palace is not necessarily a sanitary establishment from the all-important standpoint of whether or not foodstuff is being contaminated with filth.

Inspection and evaluation

To institute the inspection service, a series of complete and comprehensive inspections are made of the entire premises of the food plant, covering every detail both in and outside, to determine the existing insanitary conditions and the possibilities of contamination to raw materials and finished products. These findings are then carefully evaluated, both individually and in the aggregate, to determine their deleterious effect upon the foods being produced.

After the initial series of inspections, comes the all important task of setting into motion the necessary cor-

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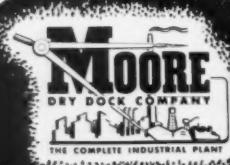
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ROLLS for processing, grinding or cutting are used by a wide range of industries in the manufacture of their product.

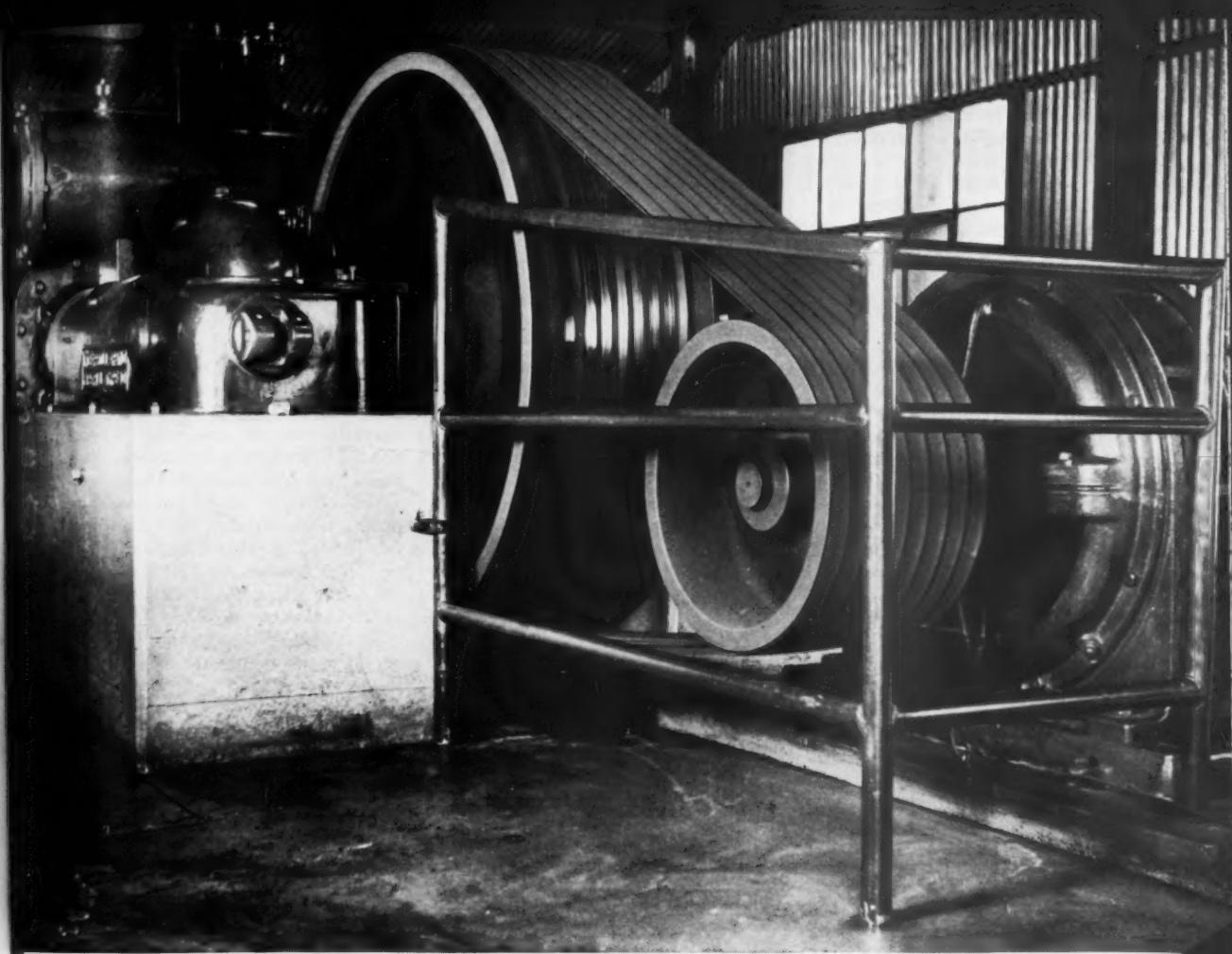
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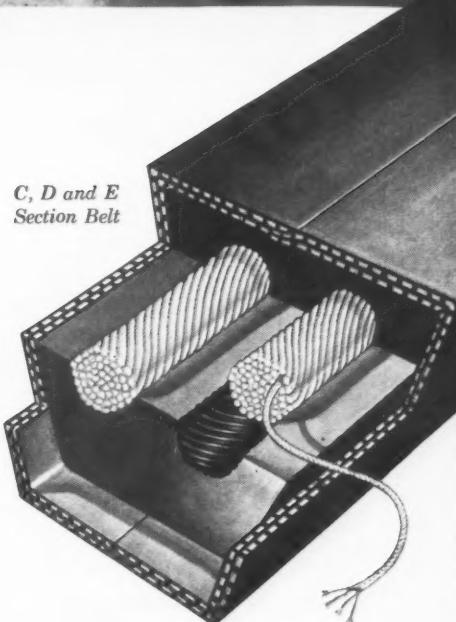
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rective measures to bring about the desired sanitary conditions. Of utmost importance in the successful execution of these measures is the in-plant sanitarian, either part time, full time, or even a full time sanitation supervisor with a staff of assistants, depending upon the plant.

In any event, it is considered essential that each food plant has its own sanitarian. He need not be a trained bacteriologist, chemist, sanitary engineer, or entomologist, but it is well that he strive to develop the combined viewpoints of these professions as they apply to the specific problems in his plant.

Where a plant does not already have such a qualified sanitarian, the job of training a selected plant employee for this purpose is often undertaken by Food and Drug Service, Inc. This is done as an integral part of and in conjunction with the institution and development of an improved sanitation program.

First things first

Immediate corrective measures are aimed at the elimination of direct avenues of contamination to products. These involve various recommendations pertaining to such matters as:

1. The receipt, storage, and handling of raw materials.

2. Specific insanitary practices in the various manufacturing processes.

3. Cleaning and cleanability of equipment.

4. Personnel unhygienic practices.

5. Hidden infestations.

6. Possible harborage and breeding places of bacteria, insects, and rodents.

7. Repair and maintenance work necessary to eliminate harborage and to prevent insect and rodent entry into the plant.

Individual conditions

Close contact is necessary with both management and the plant sanitarian in order that the maximum good be accomplished. Every effort and opportunity is taken to educate plant personnel, with the object of developing a better concept of proper plant sanitation and personal hygiene incidental thereto.

Each plant requires that its sanitation program be patterned for its own particular needs. In the plant where a good sanitation program is already functioning, as will be borne out by the initial inspections, more rapid

strides can be made toward the superlative in food plant sanitation. But regardless of the initial findings, the existing sanitary conditions, as found, determine the basis upon and from which all further recommendations and progress are made.

Some sanitation programs, for various intrinsic reasons, progress much faster than others. Some must be motivated. The form of motivation most likely to result in the desired progress in a given plant is carefully considered and judiciously employed. Cooperation of all concerned, spearheaded by the active leadership of top management, is essential. The coordinated effective sanitation program profits immeasurably from the close relationship developed between Food and Drug Service, Inc., plant management, the plant sanitarian, and the various plant employees.

As sanitary conditions improve, management and the entire plant personnel have the satisfaction of accomplishment and can feel proud of their plant and its products. Regulations of government agencies are being complied with, but more important, management and employees alike are concerned that the food they produce is clean and pure. Serious problems will

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inevitably come up from time to time, but with regular comprehensive inspections, an efficient plant sanitarian, and cooperative personnel, these will be few in number and soon corrected.

Recognition for sanitation

In 1949, with an increasing number of Food and Drug Service, Inc., inspected food plants consistently maintaining proper sanitary conditions, it was determined that recognition should be given for this accomplishment. Accordingly, the Food Sanitation Council of Food and Drug Service, Inc., was set up, and those food plants which had been inspected at least once each month throughout the year and which had been found to be consistently manufacturing, packing, and storing food products under its rigid sanitary requirements were designated as Honor Roll Plants and their products as Honor Roll Products.

Monthly Honor Roll Certificates were awarded each month to qualifying plants, and now for five consecutive years the Food Sanitation Council of Food and Drug Service, Inc., has published its Annual Honor Roll Awards. Publication of these awards affords much favorable publicity to Honor Roll Plants and in addition, dependent upon their continued monthly qualification, grants them the privilege of using the Food Sanitation Council's Seal of Approval in connection with their products.

Honor Roll qualification is difficult. Rigid requirements have been set. More than 35% of the plants regularly inspected by Food and Drug Service, Inc., throughout 1953 failed to gain the award. These plants, however, are vastly improved over earlier times and have made great progress in their over-all sanitation programs. Honor Roll designation is dependent upon consistent achievement over an extended period of time, and is determined by the Council on the basis of its monthly and in most cases weekly comprehensive plant inspections.

Qualifying plants must consistently do their job well over an extended period of time. Sanitation then becomes an integral part of their plant operation, bearing out the creed of the National Sanitation Foundation which states:

"Sanitation is a way of life. It is the quality of living that is expressed in the clean home, the clean farm, the clean business and industry, the clean neighborhood, the clean community. Being a way of life it must come from within the people; it is nourished by knowledge and grows as an obligation and as an ideal in human relations."



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PLANNED DOWNTIME is the CHEAPEST DOWNTIME

By M. E. YOUNG, Manager
San Francisco Apparatus Service Shop,
General Electric Co.

THOSE plant managers who have not considered maintenance as one of their key production control factors are not aware of the real problems they present to their maintenance supervisors.

Some of these supervisors have to spend several times what a realistic repair cost should be, simply because management is a good deal closer to production operations than it is to productive maintenance. The basic reasoning behind this relationship is understandable and often solid, but looking at it realistically, how many plant managers have enough information at their finger tips to prove a productive maintenance program is the thing they need?

The maintenance supervisor is always trying to help the production department break its own records, but seldom wins enough time to do a complete job effectively. Consequently, he must convince the plant manager that the firm will be dollars ahead with a program that allows a minimum of unplanned down-time.

At a recent productive maintenance lecture the question was asked, Do you believe your management has a positive attitude on maintenance? The answers given indicate that your maintenance program and personnel may need some personal attention.

Now, to check your own operation, run over these questions and let your maintenance supervisor help you answer.

1. Did you give your maintenance engineer enough money to properly maintain your plant?

2. Did you ask him to cut his budget request?

3. Do you insist that productive maintenance survey forms be submitted annually?

4. Do you insist that production balance sheets show time lost through unplanned outages?

5. Do you have a scheduled time to make planned maintenance repairs?

6. Do you have a maintenance specialist survey your plant and make recommendations for repairs to all electrical apparatus and mechanical equipment?

7. Do you have enough parts to make quick emergency repairs?

8. Do you know just how much turnover you have on spare parts?

9. Do you consider an investment in maintenance parts and repairs in exactly the same sense as an investment in equipment?

10. Do you hold meetings with your plant maintenance and production section to insist that planned shutdowns for repairs are not put off?

11. Do you have to call in outside maintenance help for emergency repairs? (If this answer is no, you may be over-manned.)

12. Do you feel that absence of any charges for repairs during a given period is quite as extraordinary as the occurrence of a large one?

13. Do you have your plant maintenance personnel attend the national maintenance shows to get up-to-date information on new methods applicable to your operation?

If you have answered yes to 90% of these questions, you have a plant with a minimum of unplanned downtime and low cost maintenance.

How it works

Unforeseen breakdowns continue to be a reality despite day-to-day routine maintenance efforts, and it is axio-

Here is an example of how a Productive Maintenance Analysis determined the best over-all protection for one specific motor doing one specific job.

The motor involved was a 500 hp, slow speed d-c motor on a machine critical to production at a large Western paper mill. The problem was to determine how much an armature failure would cost. Down-time was estimated at \$700 per hour. A G-E maintenance specialist helped the customer decide to stock a complete armature for best protection.

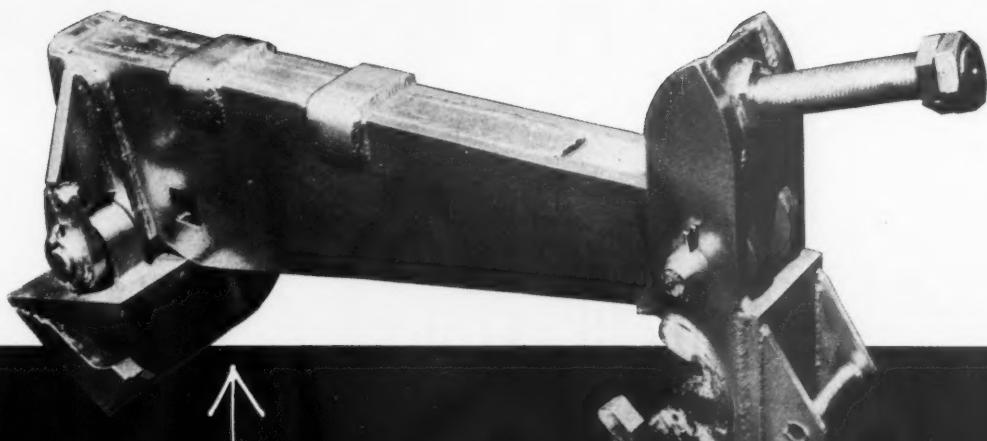
Evaluation of critical parts protection requirements

(The evaluation is based on the failure of a part which requires the longest repair time, such as armature coils.)

Repair time	No critical parts stocked	Armature coils stocked	Complete armature stocked	Complete motor stocked
Total downtime	\$168,000	\$100,800	\$4,900	\$2,100
Cost of parts protection	0	Coils: \$4,664	Armature: \$25,600	Motor: \$46,000
Cost of repair	\$12,730	\$5,900	Installation: \$850	Installation: \$360
Total failure cost	\$180,730	\$111,364	\$31,350*	\$48,460*

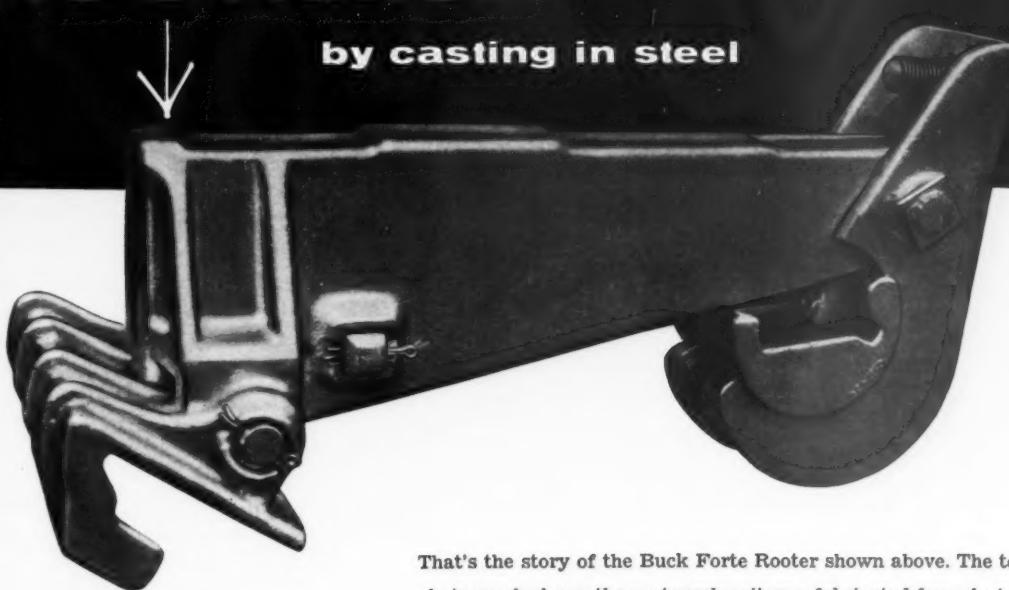
* Add disassembly, assembly and transportation time to actual repair time.

* Add repair cost, on straight time basis, of failed unit.



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There are fewer rejects: since warpage and distortion from thermal shock are practically eliminated, units remain within required tolerance.

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No cleaning or pickling are necessary since Superwelded parts emerge from the furnace clean and bright.

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matic that they usually occur at the worst possible times. Under today's round-the-clock operations in many plants, such breakdowns result in production losses that can never be made up.

Productive maintenance is an approach to maintenance that emphasizes the positive part it can play in increasing plant output. This new emphasis regards maintenance not as the step-child of production, but as its working partner. It anticipates and minimizes untimely production breakdowns, and seeks to maintain the "like-new" efficiency of equipment.

Key to productive maintenance is planned down-time, wherein important production equipment is removed from operation for inspection and complete reconditioning on a planned and systematic basis at the most favorable time for productive purposes. As an important corollary, it calls for keeping on hand an adequate supply of needed renewal parts, and in some critical cases, complete spares.

Planned outages permit making more efficient use of your production workers, because they are kept busy on a scheduled basis. Unplanned shutdowns mean they must stand around idle, or even be laid off if the shutdown is a lengthy one. Under today's conditions, discharged workers can easily find work elsewhere. In that event, new employees must be trained, and productivity suffers meanwhile.

HYDRAULIC BARKER for Union Lumber

THE UNION LUMBER CO. of Fort Bragg, Calif., has installed a Bellingham hydraulic log barker to remove bark from redwood logs.

Operation of the new barker should prove a boon to maintenance of the lumber mill's cutting and materials handling equipment. Redwood bark has long been one of the major headaches in the life of a millwright, tangling in the drive sprockets of the main log slip, crowding the chain off the sprocket, and generally following head block skids, wheels, and track.

Clean logs will keep saws sharp longer, resulting in better lumber, faster cutting, and less waste material. It will also make the jobs of the sweepers and millwrights easier by preventing jams in the sawdust conveyor and machinery. It is hoped that eventually the presence of the new barker will reduce if not eliminate the cost of pond dredging.



L. W. Waters, Maintenance Supervisor
Hunt Foods, Inc.
Fullerton, California

"We had a severe problem with bearing failures before we started using Union's UNOBA grease in our numerous canning machines packing Hunt's tomato sauce, pork and beans, peaches and other fruits and vegetables.

"Hot sauce and moisture, which tend to find their way into the carbon steel roller bearings on the seamer rolls and wash out the lubricant, were subjecting these vital parts to corrosive action and excessive wear. To counteract this we asked our Union 'lube engineer' to recommend a grease with great retentive quality plus high temperature,

"Hunt for the best—

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water and corrosion resistance. He supplied us with UNOBA F-1 which has more than satisfied all of these requirements. Using this fine product generally throughout our entire plant is helping to keep maintenance costs low in a business where dependability and low operational overhead are so important."

If you have lubrication problems involving heat, water, corrosion or any combination of these conditions, you need a grease that really "stays put"—UNOBA. Call your nearest Union Oil Representative.



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HOW TO

• get new industries • and keep old ones

Work shop session covers many angles for developing more markets in the West

The occasion. Industrial Development Workshop, jointly sponsored by U. S. Chamber of Commerce, California State Chamber of Commerce, American Institute of Planners, and College of Business Administration, University of Santa Clara, California. Held at the University June 13-15.

The reason. Communities throughout the West are obviously on the march to bring in new industries, either for the purpose of acquiring payrolls or dividing up the tax load.

The theme. How to provide a better climate for industry, both new and old, in small and medium-sized communities in the West. How to handle the problems arising from the presence of industrial establishments.

Summary of proceedings

Public opinion (Wesley C. Ballaine, Director, Bureau of Business Research, University of Oregon). A survey in the Eugene-Springfield area showed highly favorable attitude toward existing plants, apparently confirmed by vote favoring heavy industry zone. Asked whether companies paid a fair share of taxes, 71% said "yes," compared to 56% three years ago; whether they contributed to and cooperated with community programs, 37% said "gives generously," 34% "contributes fair amount," 41% "don't know."

Chambers of commerce can hold retail trade from going to larger towns by sponsoring training programs for retailers and their clerks. Larger cities can encourage wholesaling.

Community prosperity (John W. Watt, Jr., Director, Oregon State Development Commission). Extractive industries tend to be highly seasonal and cyclical. Lumber and agriculture cause big unemployment in winter, labor scarcity in summer. Conversion

industries less seasonal and bring more wealth, e.g., Douglas fir, where addition of manufacturing processes makes more effective use of its waste pulp, hardboards, wax, tannins, pharmaceuticals, oil well lubricants.

Concentration trends (Karl Belser, Director of Planning, Santa Clara County). Approximately 55% of total U. S. population now concentrated in 100 metropolitan areas, only 25% remain on farms. Larger cities require larger percentage of service facilities, and maintaining simple communication is difficult. Population should be distributed in such manner that communities can pay for the services required. Uncontrolled subdividing cuts into farming areas and makes farming unprofitable, impairs tax structure so schools are difficult to support. Santa Clara County zoned 744 acres of choice pear land to save it for agriculture.

Industrial location (Robin Hood, Coldwell Banker Co., industrial realtors, San Francisco). Industry wants to know assessment practices as well as tax rates, quality of water as well as quantity, availability of facilities, what kind of neighbors — food processors don't want smoke and odors.

Location problems (Archie M. Schwieso, vice-pres. Basford Mfg. Co., Santa Cruz, Calif.). Street improvements, on account of heavy trucking requirements. Flood control, seldom planned by the city. Special assessments and improvement districts. Specific problems usually involve the community as well as the industry, therefore management must help solve it. Our own troubles with a storm drain a case in point.

Westward trend (A. V. K. Babcock, industrial development manager, Ari-

zona Public Service Co.). Migration is bringing about the industrial development of the West and Southwest and developing new markets. Industry in the East and Middle West recognizes the opportunities, not just to tap this new source of wealth but to meet competition from Western industry which is capturing a large share of the business. Possibly Arizona's greatest attraction is climate, which has provided a sizable and competent labor force in depth. Because it is not a target area, it has attracted Reynolds Metals, Goodyear Aircraft, Hughes, and Douglas. Light diversified manufacturing industries find it strategically located between the two fastest growing industrial areas, California and Texas. Air-conditioning, apparel, electronics, and other industries are being attracted to Arizona.

Municipal coordination (Robert L. Clark, industrial coordinator, Fullerton, Calif.) In 1951 it became apparent the city would have to face the problems resulting from the mass migration into Southern California, and my office was created. Some of our solutions were: (1) completed annexation of fringe areas to permit extension of city services; (2) completed M-1 zoning of the area to protect the industrialists' investment and insure proper future development; (3) provided land for the extension of rail service and other utilities; (4) extended city water and sewer service throughout this land; (5) provided a comprehensive plan of layout showing street access, width, setback requirements, etc. (6) set up cooperative program between industry and the schools to train students for typical jobs, by offering training on similar equipment. Determined Fullerton to be best suited for light manufacturing and concentrated efforts on instruments, electronics, and paper processing.

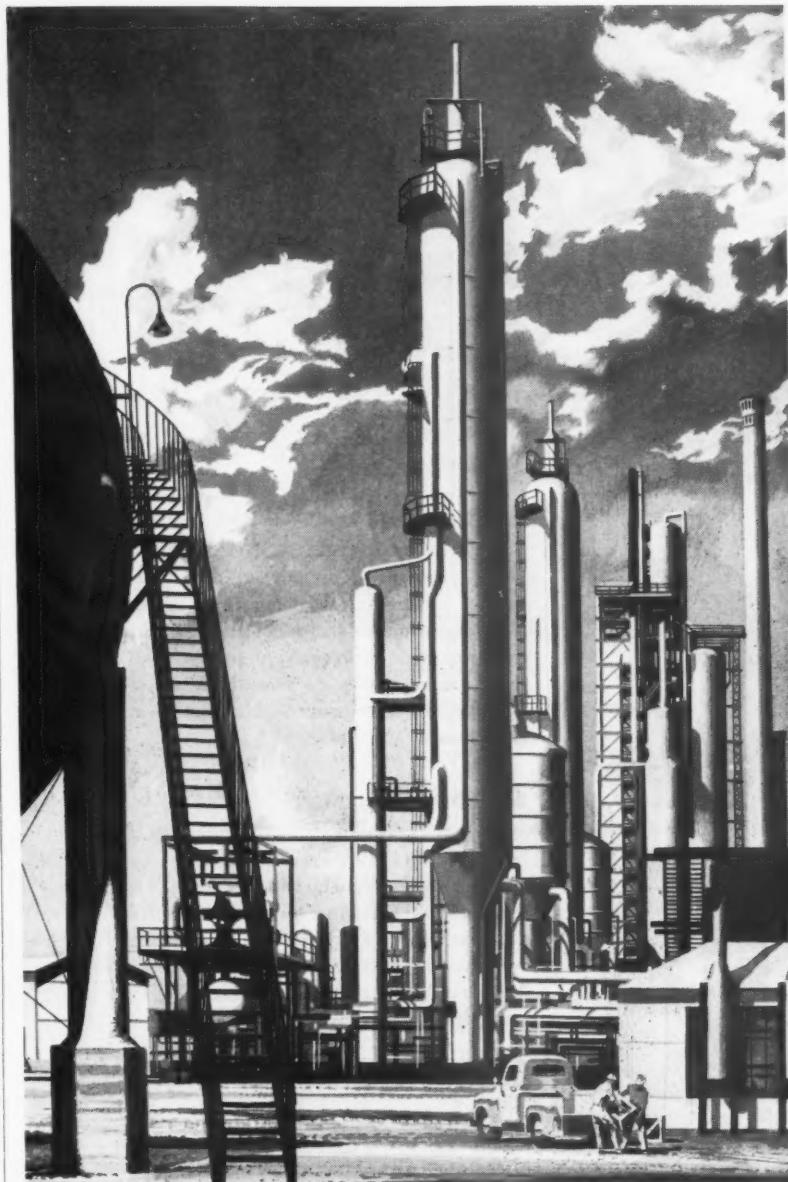
Creating new jobs (R. H. Windishar, president, McMinnville Industrial Corp., McMinnville, Ore.). Decided not to try for payrolls out of proportion to size of our town, but to get several small payrolls rather than one or two large ones which would create problems, and as far as possible to have them non-competitive with a good potential for growth. Found we had no special advantages to offer except a pleasant community in which to live, so we provided the incentive of risk capital by organizing our industrial corporation for people with good ideas, character, and potential market. Forty-five business and professional men pledged enough to enable us to commit ourselves to two projects totaling \$54,000, financed through savings and loan so the operator could borrow to acquire his inventory. Do not expect to make money out of the corporation, are interested only in bringing payrolls to the community, and we have 200 additional jobs as a result.

Attracting industry (Cecil Fegley, manager Pittsburgh-Des Moines Steel Co., Santa Clara). If industry is to build plants on the West Coast it must have reasonable assurance that business is available in sufficient volume to justify the investment.

Finding industrial prospects (Oscar Monrad, vice-pres. First Nat'l. Bank & Trust Co., Oklahoma City). Best way to learn whether a company is planning to expand or relocate is to ask the top man. I had a weekly call sheet of local people to visit with by telephone to find what they knew and were doing, which helped develop a substantial and worthwhile prospect list. At Pine Bluff, Ark., members of the chamber of commerce wrote 565 letters to their supply manufacturers, got 175 replies and found 21 hot prospects. Specific plans become monotonous and lose effectiveness; revise your prospect list frequently. We had an engineering study of resources made by Blaw Knox, submitted them to ranking officials of companies when interested, got four prospects out of 14 potentials. Give your prospects unbiased facts.

Industrial foundations for community financing programs have grown tremendously in last five years and attract industry to many cities because their very existence indicates industry will be welcome and given loyal support. They keep land prices under control, provide buildings where the industry does not want to tie up capital in brick and mortar, furnish sites.

Local help (Russell Pettit, manager, San Jose Chamber of Commerce). We



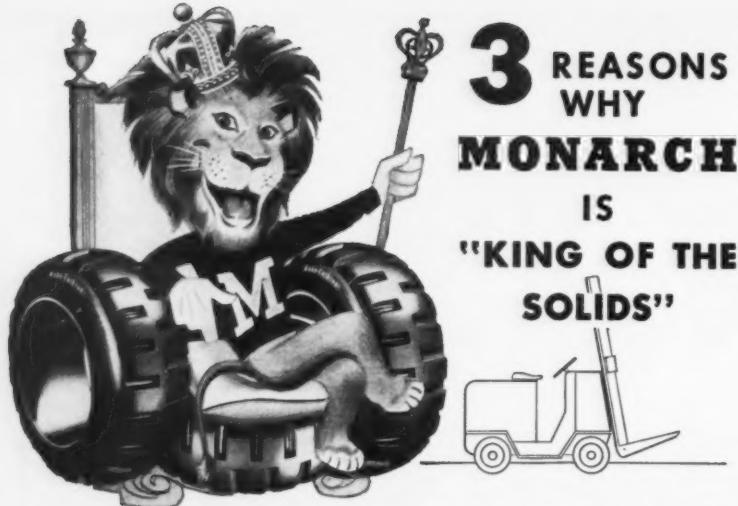
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For more than 20 years, MONARCH's research men have concentrated on developing tire stocks that feature outstanding wear resistance and service life. Tests that simulate severe lift truck operating conditions are made continually to analyze and improve these special stocks. As a result, MONARCH supplies performance-proven industrial solid tires . . . the best available today.

2 INDUSTRIAL TIRE DESIGN



MONARCH engineers, working with lift truck manufacturers, have created tire and tread designs that cushion shocks and shock loads . . . assure maximum stability on short turns and high lifts . . . have superior non-skid qualities . . . steer easily . . . wear evenly under hard usage. These characteristics minimize maintenance costs and fatigue for vehicles, loads, floors and drivers.

3 INDUSTRIAL TIRE PRODUCTION



MONARCH specializes in solid and Mono-Cushion® types of industrial pressed-on tires. As a leading supplier, MONARCH has a type and size to meet every lift truck requirement. All research, engineering and production facilities are directed to the continual improvement of the complete line. MONARCH tires are mass-produced by modern equipment. High quality and performance are assured through carefully controlled production techniques and by selection of only the best raw materials.

1961-MR

SPECIALISTS
IN
INDUSTRIAL
SOLID
TIRES

YOUR NEAREST MONARCH TIRE DEALER
is listed in the Yellow Pages, under
"Trucks-Industrial-Parts & Supplies" or
"Tires-Industrial". If current directory
does not have a listing, write direct
for complete catalog and name of
nearest dealer.



THE
MONARCH
RUBBER COMPANY

280 LINCOLN PARK • HARTVILLE, OHIO
7-255 General Motors Bldg., Detroit 2



ask our local business people who they buy from, do they have Western plants, get them to ask the salesmen why their firms do not have Western plants.

The West's future (Emanuel Rapoport, industrial investment analyst). The West's population probably will be 30,000,000 by 1970. Our military programs will be a permanent industrial activity because we are in an international struggle for power. Today's agricultural surpluses will be no problem in the long run, but diet changes will affect our food processing industries. Biggest total of marriages the country has ever seen will come by 1960 when the baby crop of the '40s comes to the altar. This will cause a big housing rush. Use of building materials in the West has increased 2½ times, against 50% increase for the whole country. May be spectacular growth in chemicals, plastics, electronics. Not too much growth ahead for aircraft, but obsolescence will keep things humming. Smaller communities should take inventory of their manufacturing talent; it will produce surprising results. Ten small local plants better than one big branch plant. Ford says (response from Tudor Walsh, Kaiser Steel Corp.) West is due for an engine plant when assembly reaches 1,000 cars a day. Frames may come any time. Bodies in entirety not for many years.

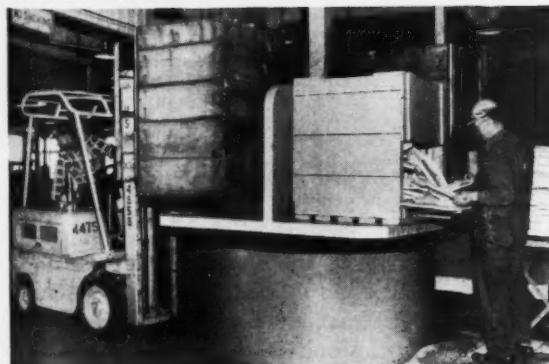
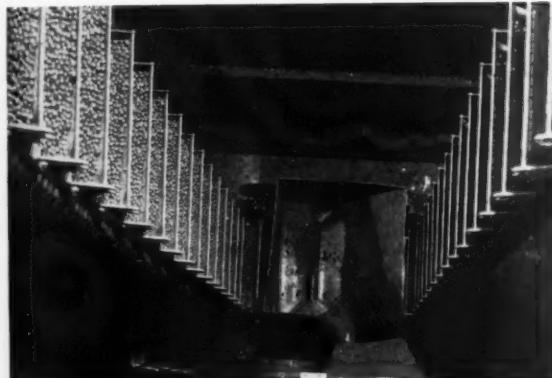
Insurance company financing (Willard Hansen, San Francisco, regional manager, The Prudential Insurance Company of America). Three methods, conventional mortgage loan, purchase lease-back arrangement, promissory note issue. For mortgage, a modern general purpose type building most desirable, when special types required credit standing of borrower becomes more important. For purchase lease-back, primary lease should be 20 to 25 years, with renewal options at a lower rental up to 30 or 40 years beyond. Level payment rental of 7% of purchase price for 25 years will provide interest rate return of 5% and completely liquidate the investment. High-low pattern would do it at 8.58% rental for 15 years and 2.58% for 10 years, or an average rate of 6.81%.

Private site facilities (Bruce Craver, manager, Stockton Chamber of Commerce). Five hundred citizens purchased \$256,000 worth of stock at par value of \$100 a share to form profit corporation for purchasing 196 acres within the city limits for resale at \$2,500 an acre. First unit of 57 acres has been subdivided and purchaser

SPECIAL ISSUE

MATERIALS HANDLING

AUGUST 1954



**TIE IN YOUR ADVERTISING with the FIFTH
WESTERN PACKAGING AND MATERIALS
HANDLING EXPOSITION, San Francisco,
August 17, 18, 19**

Reach more than 10,300 equipment buyers in Western plants under timely circumstances . . . This issue ties in with and will be available for distribution at the show, from our booth (#324). Entire editorial feature section will cover materials handling subjects.

FINAL FORMS CLOSE JULY 25

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RATES	2/3 page . . . 186.67	1/3 page . . . 93.33
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receives land with needed improvements and facilities. Two parcels of 2½ and 7½ acres sold. Fresno and Sunnyvale have similar propositions.

Converting an airport (C. O. Brandt, manager, Municipal Airport District, Chico, Calif.). Surplus Air Force property reverted to city with miles of paved runway, etc. has been converted into industrial district where 492 persons are employed by 24 tenants, annual payroll \$1,565,429.

Tax structures (John Shirer, Bureau of Business Research, University of Arizona). Scientific appraisals indicate tax exemptions and other tax favors greatly overrated as attracting industry. However, Nevada has a "free port" law providing for tax-free warehousing of goods in transit. Reno claims warehousing space has increased greatly in last four years; whether Las Vegas, serving Los Angeles, will show similar enthusiasm remains to be seen. Arizona eliminated an inventory tax on raw materials, work in process and finished products of manufacture, manufacturers' privilege sales tax of 1/4 of 1% and reduced assessment of machinery and equipment of manufacturers from cost basis

to 50% of book value, in effect a 50% reduction. Purpose was as much to retain existing industry as to attract new. Manufacturing employment in Arizona approximately doubled from 1950 to 1952, and Phoenix Chamber of Commerce believes these tax reforms had more to do with it than any factor.

Consistent treatment (Harry Marks, mayor of Modesto, Calif.) Industries must be treated fairly on taxes, and the rates must be firm, so they know what the situations will be five years hence. Zoning must provide ample areas, and must be continually evaluated, not just once.

HOW TO KEEP TRACK of truck repair

A TRUCK REPAIR and maintenance program based on the use of two simple forms serves to keep all key people informed and shows Peterson Manufacturing Co., Inc., Los Angeles, exactly what has been done to each vehicle at all times.

No work is done on any of the firm's 55 trucks until a "Truck Re-

pair Request" has been filled out in triplicate, by the driver of the truck, the truck foreman, the garage supervisor, or other company official.

This form, 5 x 8 in., has space allotted for: date, repairs requested, repairs made, repaired by, checked by, and any other pertinent remarks.

One copy goes to the garage foreman, one is retained by the truck foreman, and one comes to the desk of the general manager. The latter sees that the work has been completed, checks the amount of time needed to make the repairs, and checks to see who checked the results. This operation has been instrumental in eliminating many disputes as to whether repairs have been made.

Each truck also has an orange card about 6x9 in. on which is a check list covering such items as: front wheel bearings, differential, transmission, crankcase, door locks, chassis springs, distributor cam, etc. This card goes with the truck each time it goes in for repair, and is signed and turned in after the job is completed.

At the end of the year a glance at these cards will produce an estimate of the repair work on any truck.

There's a MORCK Paint Brush For every production or maintenance job

Hundreds of
Industrial Plants
use Morck exclusively



Morck Brushes are not just of the run of the mill variety . . . they are designed to meet specific needs. Built to high standards of workmanship, Morck has earned an enviable reputation for nearly half a century in industrial plants and from professional painters.

Now, MORCK BRUSHES are made with Hog and NEOCETA Bristle . . . and tests from

coast to coast prove them exceptionally fine brushes . . . carry and spread paint evenly and smoothly over a maximum area. (Also made with Hog Bristles and Horse Hair.) From a cost and production standpoint, center your buying around MORCK BRUSHES. Guaranteed to give satisfactory working performance. Consult your supplier, he knows the true values of these brushes.

Morck Brush Division

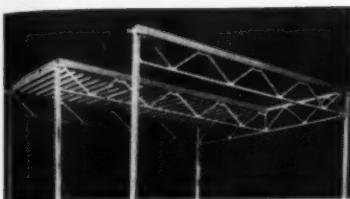
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BRUSHES • PAINTS • GLASS • CHEMICALS • PLASTICS



PITTSBURGH PLATE GLASS COMPANY

NEW DESIGN cuts building costs



MODEL showing framing from below.

J. H. POMEROY & CO., INC., Los Angeles, have used some unusual truss designs in building a warehouse for the Pioneer-Flintkote Co. in Los Angeles.

The principal novelty lies in the new truss design and the extreme simplicity of the structural framing. The truss is a combination of wood and steel. Since wood is best adapted when used in compression, and since steel is most efficient when subjected to tension stress, considerable economy can be achieved when these materials are used together.

The wooden top chord, which is in direct compression, also carries the roof joists in bending between the panel points in the truss. All vertical web members are thereby eliminated. The steel lower chord is in tension and is made in one continuous length without the necessity of splicing.

Diagonal members of the truss are all alike and interchangeable, having been designed to cut from standard 60-ft. mill lengths without waste. All angles are punched in one leg only, which saves shop handling and labor. All of the steel required in this design can be made up from standard stock items, purchased without delay, and the entire assembly of the truss is done by bolting with pneumatic impact wrenches on building site.

CLEANING UP electric motors

Electric motors of any size can be cleaned with alkaline solutions just like other equipment, provided that these solutions will not harm the insulating varnish, according to Donald A. Keating, division manager of Turco Products, Inc., Los Angeles.

This can be accomplished by dip, brush, or wiping rag. However, when cleaning is accomplished by using an

alkali, the motor must subsequently be placed in a baking oven to completely dry out the insulation.

If drying is not complete a flash-over may occur and ruin a field coil. Since heat will also damage insulating varnish, it is desirable to steam clean the motors as fast as possible.

Most electrical shops use a solvent of some type to clean electrical equipment in order to stay away from the disadvantages of water and of heat.

EXHAUST PIPE SPECS- Eight installation suggestions

EIGHT SUGGESTED general specifications for average duty industrial exhaust system piping, from Ralph Trent of Pasadena, California, Pacific Coast manager for the Pangborn Corporation, are given below:

1. Keep bottom of pipe straight throughout its entire length — to avoid dirt-collecting pockets. Make changes in area with gradual taper top and sides only.

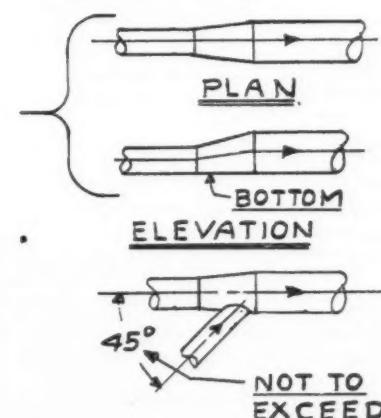
2. Make branch connections only into side or top of tapered section of main-pipe. Angle should not exceed 45 deg., and preferably be 30 deg. Branch connections should enter near large end of tapered section, not ahead or behind.

3. Lap joints in direction of air flow. Keep piping free of obstructions.

4. Piping should be substantially supported throughout its length by strap iron, angle or rod hangers.

5. Provide cleanout openings ab-

WHERE POSSIBLE, construct main dust pipe with bottom of pipe straight throughout its entire length.



solutely air and dust tight in lower side of pipe at regular intervals and adjacent to bends, junctions, vertical risers, etc. Provide end cleanouts with removable caps with handles. Cleanouts not to exceed 20 ft. 0 in. center spacing in pipe runs.

6. Elbows and bends should be formed with smooth curves having a center line radius equal to twice the pipe diameter and be constructed two gauges heavier than straight pipes of corresponding diameter.

7. Blast gates for system resistance adjustment should be located in branches close to their junction with main pipe and provided with means for locking in adjustment.

8. Construct piping of galvanized iron with riveted and soldered or lock seam joints; or black steel with welded joints of the following gauges:

4 to 12 in. diameter—No. 20 gauge

12 to 32 in. diameter—No. 18 gauge

32 in. diameter and over—No. 16 gauge

REFINING PROCESS

A BASICALLY new refining process which will unite the cracking and combining functions of reforming into a single operation, thus raising the economic ceiling on octane numbers, is due within five years, predicts H. G. Vesper, vice-president, Standard Oil (Calif.).

GAS TURBINE more powerful, economical

A NEW GAS TURBINE engine, combining the advantages of greater power and economy than its predecessor, has been developed by Boeing Airplane Co., Seattle, Wash.

The engine, designated Boeing Model 502-10, is a development of the company's Model 502-2, which powers a variety of vehicles, aircraft, boats, pumps, compressors, and generators. It produces a maximum of 270 hp. and its normal rated power is 240 hp. This is a 65 hp. increase over the earlier model gas turbine engines.

In developing the engine, power was increased and fuel consumption reduced by 25% through the refinement of compressor and turbine designs and by raising the pressure ratio of the compressor.